

and **ROADS STREETS**

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

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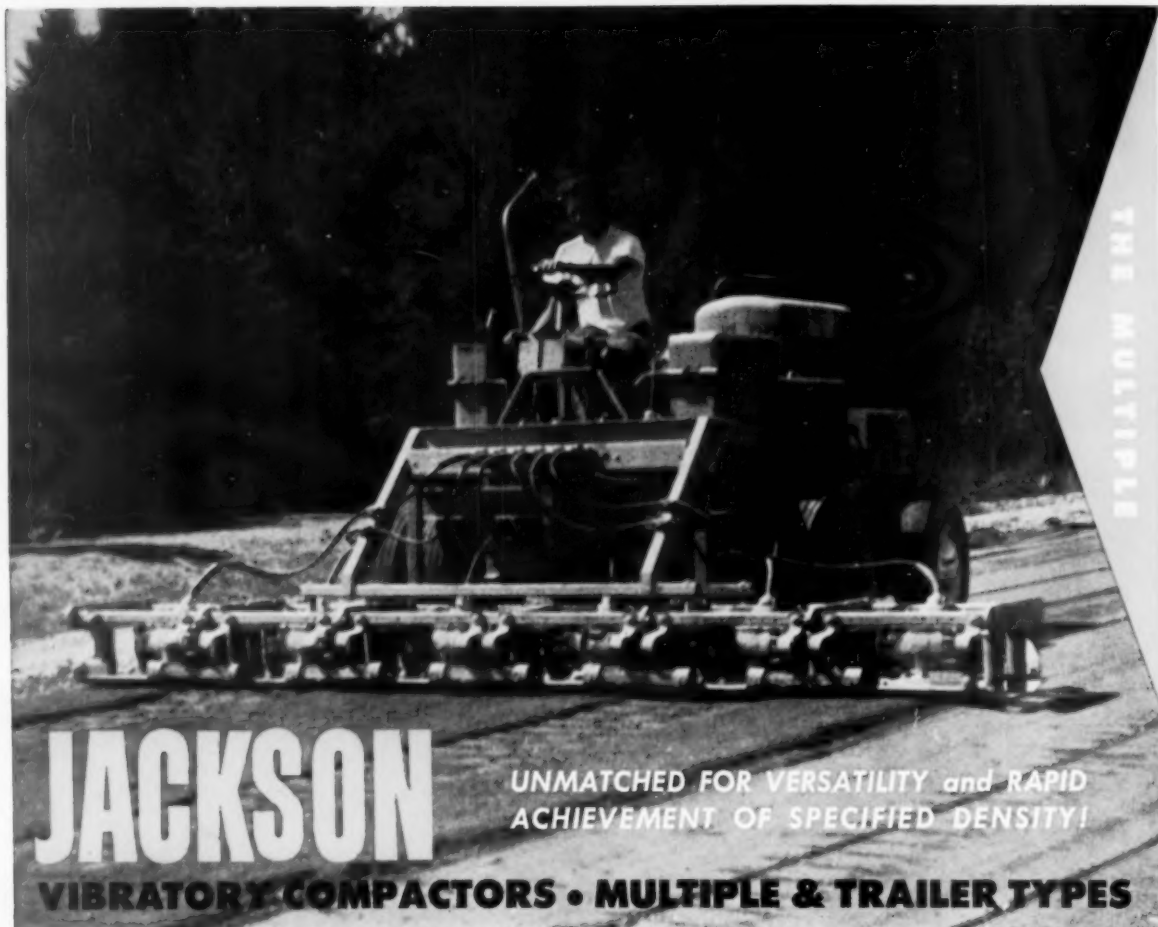
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June, 1959



THE MULTIPLE

JACKSON

**UNMATCHED FOR VERSATILITY and RAPID
ACHIEVEMENT OF SPECIFIED DENSITY!**

VIBRATORY COMPACTORS • MULTIPLE & TRAILER TYPES

Each of the compactor units employed in the workheads of these machines supplies FORTY-TWO HUNDRED 6,000 lb. VIBRATORY BLOWS PER MINUTE and achieves maximum density of any granular material used in base courses and fills in the fastest possible time.

Each compactor unit may be operated independently and hence units may be detached from the maximum coverage arrangement of 6 units in the workhead (13', 3") to ideally fit each job; or they may be regrouped in a wide variety of tandem arrangements for more rapid densification of narrower areas. And in the case of the TRAILER COMPACTOR as many as eight compactor units may be employed in two workheads of 4 each — one in front and the other following the trailer.

NEWLY DESIGNED COMPACTOR BASES PERMIT OPERATION OF BOTH THE MULTIPLE AND TRAILER COMPACTORS IN EITHER DIRECTION — NO DEADHEADING OR TURNING REQUIRED.

Used on nearly all of the nation's major highway projects, including the AASHO Test Road, the JACKSON MULTIPLE COMPACTOR has thoroughly demonstrated the outstanding advantages of this method of compaction. With the advent of the JACKSON TRAILER COMPACTOR it is conveniently adaptable to paving projects of nearly every type and size.

... for more details circle 337 on enclosed return postal card



JACKSON TRAILER COMPACTOR — May be pushed or pulled by any prime mover capable of working speeds as low as 50 F.P.M. Towed to location at any road speed ... operated in either direction ... controlled by operator of prime mover. Power plant supplies both single and 3-phase 110-150 volt, 60-80 cycle A.C. and has many uses.

FOR SALE OR RENT FROM YOUR JACKSON DISTRIBUTOR. Name and descriptive literature sent on request.

**JACKSON VIBRATORS
INC., LUDINGTON, MICH.**



Denton Company's paving crews, using Bethlehem road steels, established a new record of 6,029 ft in a single day.

Pavers Set New Daily Record in Michigan



Michigan State Highway Department officials meet at the job site shortly after the record was established. Left to right: Gordon Thomas, Ontario Highway Dept.; Leet Denton, Contractor; C. B. Laird, Chief Construction Engineer, Michigan State Highway Dept.; J. C. Mackie, Michigan State Highway Commissioner; Charles Leduman, General Superintendent, Denton Construction Co.; Frank Skebensky, Metro. District Road Engineer, Michigan State Highway Dept.; Carlos Weber, Chief Engineer, Michigan State Highway Dept.; Mickey Palmer, Project Superintendent, Denton Construction Co.; and Pete Branstrom, Project Engineer, Michigan State Highway Dept.

A new national record for concrete road pavement laid in one day was set on August 12 by the Denton Construction Co., Grosse Pointe Woods, Michigan.

Working on U.S. Highway 23, south of Dundee, Mich., the Denton crews laid 6,029 ft of nine-inch-thick pavement 24 ft wide in 12½ hours, announced by Michigan State Highway officials as the new national record.

Bethlehem supplied mesh, dowel units, hook bolts, base plates and reinforcing bars for this stretch of pavement.

The previous record of 5,787 ft in 12½ hours was set in July, on a stretch of the Detroit-Chicago expressway near Battle Creek, by the Sargent Construction Co., Saginaw, Mich. Bethlehem also supplied the road steels for this stretch of highway.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributors Bethlehem Steel Export Corporation

BETHLEHEM STEEL



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ROADS AND STREETS

A GILLETTE PUBLICATION •

JUNE, 1959 •

VOLUME 102 •

NUMBER 6

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Grading Methods

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Paving Plants

Also coming, a series of reports on latest concrete and asphalt plants, as set up by contractors for highway and airport jobs. For example: hot-mix

plant with huge bins fed directly from quarry crushers.

European Road Building

Highway construction practices of European countries will be reviewed soon by a top German administrator, plus on-the-scenes observations.

Road Contractors: 1959

A fresh picture of what is happening to road contracting—how the fraternity has grown in numbers, in capacity, size range, specialization; practices shaping up for good or otherwise.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription \$6.00 per year (\$7.00 foreign).

BIG JOB COMING UP?



GO WITH GOODYEAR—

for Big Job profit protection

BIG-JOB ANALYSIS:

Goodyear Big Tire Specialists first check every phase of your project.

They carefully analyze each problem of terrain, climate, loads, haul roads, schedules, speeds and other factors.

They recommend, from Goodyear's wide assortment, precisely the tread and tire designs best fitted for your particular job needs.

BIG TIRE EXPERIENCE:

The selections are based on the broadest practical experience available anywhere—for Goodyear has built **MORE** pneumatic vehicular tires than anyone else.

The selections are based on today's top tire-building advancements—for Goodyear pioneering paces the industry; Goodyear **EXCLUSIVES** include the most practical tread and body designs, rubber compounds—and Triple-Tough 3-T Nylon Cord, **GREATEST TIRE SAVER IN 24 YEARS.**

BIG TIRE SERVICE:

Goodyear Big Tire Specialists will help you set up a tire-saving operating and maintenance program to save you **BIG MONEY** in man-hours, machine-hours and useful tire life. If your job requires them, Goodyear contractor service personnel will travel with your job—handle all your tire maintenance and repair needs.

And BIG TIRE PERFORMANCE!

Example: SUPER HARD ROCK LUG

Goodyear has the right worker for *every* wheel. For instance, the new Super Hard Rock Lug (shown at left)—the best-performing wide-base off-roader made—with new "square" shoulder design that packs hefty bonus rubber for stronger bite, longer wear—yet costs no more than conventional wide-base tires!

For all this—see your nearby Goodyear dealer—or write Goodyear, Truck Tire Dept., Akron 16, Ohio.

TRUCK TIRES by

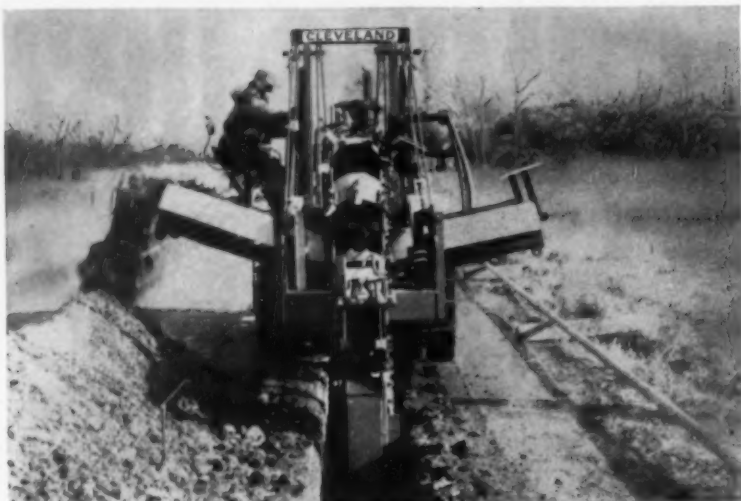
GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Watch "Goodyear Theater" on TV every other Monday evening

ROADS AND STREETS, June, 1959

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Cleveland "J" digs 20'/m through scored pavement

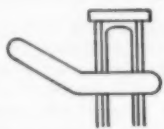
V Conveyor

...permits faster, higher spoil discharge, higher heaped loads without clogging.



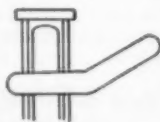
Hydraulic Conveyor Shift

...permits digging past poles, trees, etc., without interrupting other operations.



Independent Hydraulic Drive

...controls conveyor speeds and direction of discharge.



Hydraulic Crumbing Shoe

...optional, extra... pivots upward... allows setting wheel to required depth at walks, drives, underground obstructions.



This Cleveland J-20, digging for 4 and 6-inch pipe on a Colorado utilities job, averaged 20 feet per minute as it cut through scored pavement and 8 inches of frost. Note the clean neat cut through paving and frost. Contractor's report indicates he was particularly pleased with the J-20's easy maneuverability as well as its high production on this job. All operations of the J-20 are controlled at the operator's seat.

World's Finest Trencher Crawlers

...double flanged sprockets, wheels, rollers...drives on each end of 1½" diameter hardened pins...eliminates plugging...sealed ball and roller bearings...1,000-hour lubrication...a tremendously long-lived, easy-rolling track.



Get Bulletin L-104 on Cleveland "J" trenchers from your local distributor...or write:



The CLEVELAND TRENCHER Co.

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO



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ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 67 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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NOW..clam-action 4-in-1 PLUS values in NEW TD-6 and TD-9 crawlers!

NEW 6-cylinder diesel smoothness and power wallop! Both the new TD-6 and TD-9 Four-in-One's are powered with the millions-of-hours-proven, direct-starting, 6-cylinder International UD-282 diesel. Naturally-aspirated in the TD-6, it produces 55 net engine hp; turbocharged in the TD-9, it delivers 71 net engine hp!

New job-getting efficiency! Both the new TD-6 and TD-9 Four-in-One's have increased track length, for new tough-job stability and flotation. Both are geared with new speeds for greater tough-job capacity. Both have the power-transfer efficiency of new full-face, sintered metal engine clutches.

And both the new TD-6 and TD-9 have exclusive vented track-roller and idler shafts, assuring positive seal protection from over-lubrication. Big 300%-increased lube capacity shells provide 500-hr. track-roller greasing intervals!

Move the selector lever! Prove versatility unlimited of exclusive 4-in-1 as Skid-Shovel; space-saving, bottom-dumping clamshell; full-sized bulldozer; inch-close-accurate "carry-type scraper." Add up how many tens of thousands of dollars a new TD-6 or TD-9 four-in-one can save you, doubling for one limited-duty rig after another! Measure the plus value of exclusive shock-swallowing Hydro-Spring. See your International Drott Distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL®
DROTT®



New 1½ cu. yd. International Drott TD-6 Four-in-One. New TD-9 Four-in-One has 1½ cu. yd. bucket capacity.

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HARBERT USES TEXACO 100% ON FLORIDA PIPELINE PROJECT

TEXACO PLAN makes mobile lube rig a complete service station

**Harbert Construction Corporation, Birmingham, Alabama,
cites fine performance record of Texaco lubricants**

Although their work on the natural gas pipeline for Florida ranges over 1,000 miles of pipeline, Harbert Corporation's equipment is never out of reach of complete lubrication. The reason: mobile lubrication rigs. And with the Texaco Simplified Lube Plan, each rig is completely equipped to service any lube point on any machine, wherever it's working. There's no time lost deadheading equipment back to a fixed service center. As a result, all equipment gets proper lubrication at the right time.

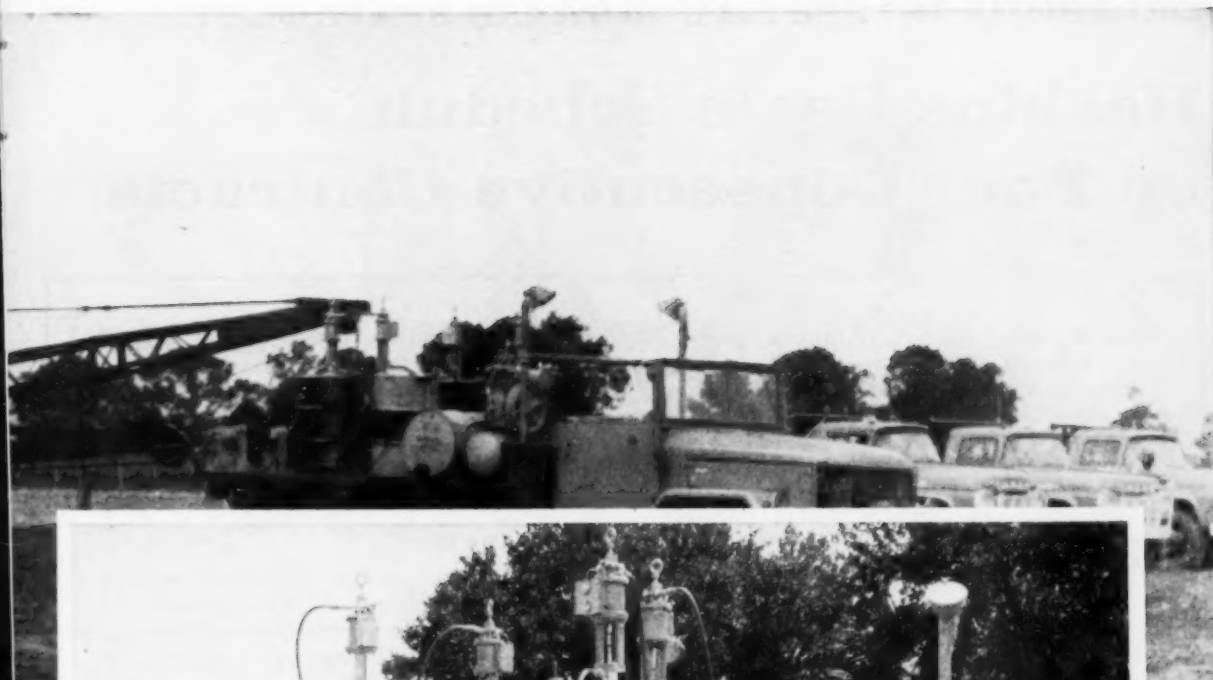
Systematic lubrication is easier with the Texaco Plan, too. The Texaco Plan indicates

clearly what lubricant goes where, and how often, so equipment delivers peak performance. And simplified inventory saves man hours in storage and handling, cuts the chance of lubricant misapplication.

A Texaco Simplified Lubrication Plan can cut costs and boost performance on your next project. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write:

☆ ☆ ☆

Texaco Inc., 135 East 42nd Street, New York 17, New York.



COMPLETE SERVICE, ANYWHERE,

is possible with a mobile rig and a Texaco Simplified Lube Plan. A Texaco Plan cuts inventory so you can put every lubricant you need for every machine on a single truck.



LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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ROADS AND STREETS, June, 1959

Haskins Beats Schedule on Four Consecutive Contracts

Ben Haskins, Cordell, Oklahoma, contractor, finished his fourth contract on Interstate highway 40 in Oklahoma 35% ahead of schedule. The first three were handled with similar speed. Interstate 40 is a new four-lane, controlled access highway which, when completed, will link Los Angeles, California, and Durham, North Carolina, with connecting Interstate routes to the Atlantic Coast. On his fourth contract—a

1,200,000-yd, \$497,000 job at the west edge of Clinton, Oklahoma—Haskins timed his Allis-Chalmers motor scrapers at 7.5 minutes per 3.26-mile cycle. Deducting 30 seconds for loading, Haskins had 7 minutes left for travel and spreading . . . a remarkable 27.7 mph average. These units are rated conservatively by Allis-Chalmers at 27.9 mph in fifth gear.

About 50% of the hauling was upgrade . . . averaging 3%. The motor scrapers had to negotiate a 15-ft dip from haul road level to detour around a bridge. The TS-260's took this detour in fifth gear. Another 2,000 feet of the haul road passed through a business district in suburban Clinton on existing Route 66. Regular traffic was maintained.

The Oklahoma Interstate 40 jobs handled by Haskins called for loading sandy clay, sandstone and

shale. Most of it was ripped for fast, efficient loading. Two unusual cuts were encountered—55 and 65 feet deep, 1,000 feet long and about 400 feet wide at the top.

To handle jobs like this in less than scheduled time takes top-notch equipment. Haskins is proving he has it. His selection of motor scrapers was made after he timed loading cycles, scaled loads and recorded travel speeds to determine comparative yards moved per hour by the three leading

makes. He chose Allis-Chalmers TS-260 motor scrapers. The rest of his fleet, all Allis-Chalmers, was selected just as carefully.

Ben Haskins' extreme dedication to detail both in the planning of his jobs and the selection of equipment has been rewarded with fast . . . yet solid growth for his 13-year-old company. Haskins personally checks every job to be bid . . . every machine to be considered for purchase. The unusual efficiency of his operations and



Part of Haskins' Allis-Chalmers fleet is shown in a big cut on one of his early Oklahoma Interstate 40 jobs.

...move ahead with



Ben Haskins, Contractor
Cordell, Oklahoma

equipment helped him complete his Interstate 40 contracts 35% ahead of schedule . . . has earned him the healthy respect of his fellow contractors who have to bid against him.

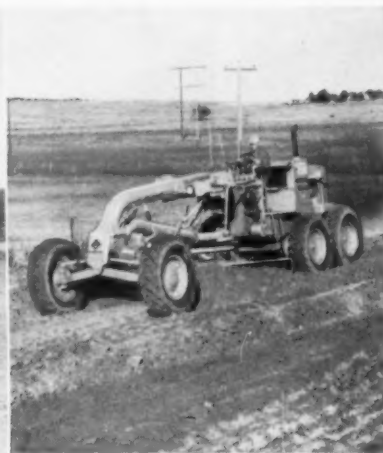
Haskins figures on . . . and gets better than 90 per cent availability of equipment during the 270 ten-hour working days he averages each year. You are entitled to performance like this on your jobs. You'll get it with Allis-Chalmers construction machinery. Your dealer has the equipment, facilities and know-how to put you out in front of your schedules. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



Some of Haskins' new TS-260's loading tough clay, sandstone and shale. The material was ripped for most efficient handling.



Averaging a remarkable 27.7 mph on the haul, these Allis-Chalmers motor scrapers completed 3.26-mile cycles in 7.5 minutes.



Allis-Chalmers FORTY FIVE motor graders maintained fill and haul roads . . . helping motor scrapers make high speed cycles.

**Allis-Chalmers Equipment
Used by Haskins on
Interstate 40 Contracts**

TS-260 motor scrapers
HD-21 crawler tractors
HD-16 crawler tractors
HD-11 crawler tractor
HD-11G tractor shovel
FORTY FIVE motor graders



TS-260 230 hp, 17 yd heaped, 44,800 lb

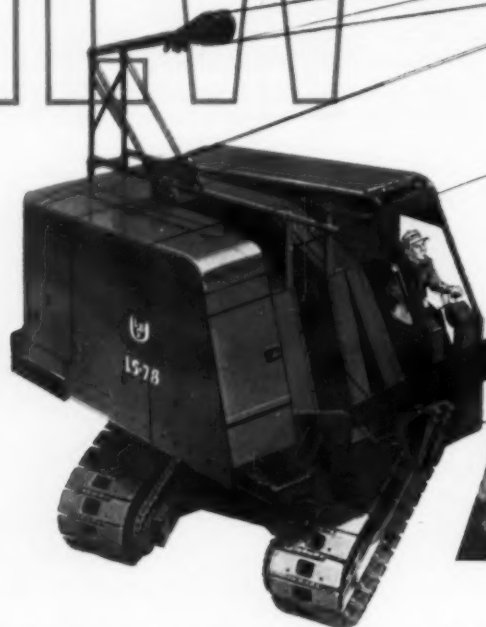


ALLIS-CHALMERS ... power for a growing world

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ROADS AND STREETS, June, 1959

NEW



LINK-BELT SPEEDER LS-78 SHOVEL-CRANES

**change the ground rules
for 3/4-yd. performance!**



Bold new base-to-boom engineering!

Every move is an exciting demonstration of performance that writes a new set of ground rules for what a $\frac{3}{4}$ -yd. shovel-crane should do! The all-new engineered LS-78 has the look and feel of stamina and strength. And it's out to let you know it with perfect balance of power, weight, speed and control. Precision-built, fully convertible, attractively priced . . . the bold new LS-78 creates dozens of *new ways* to widen your profit margins!

Power controls for the man-in-command

LS-78's exclusive Speed-o-Matic power hydraulic controls quicken cycles (up to 25%) spurt output, side-step operator fatigue. Split-control stand gives unobstructed vision of below-grade excavating. Flick-of-the-wrist levers trigger instantaneous, oil-smooth response. No jump, jerk or lag. From start-up to shut-down, your man-in-command stays mid-morning fresh. He's encouraged to push the LS-78 to its highest productive peak!

Full-Function Design tailors LS-78 to your job!

An independent power train flow for each machine function . . . bridges all restrictions of non-independent power trains. It offers more exclusive standard features, a wider choice of optional features that can be operated *simultaneously* without restricting any other function. Factory or field-install function-adding features you need anytime . . . today, tomorrow, next year.

15,130

time and motion engineered to help you profit more from men, minutes and machines

LINK-BELT SPEEDER

Link-Belt Speeder Corp., Cedar Rapids, Iowa

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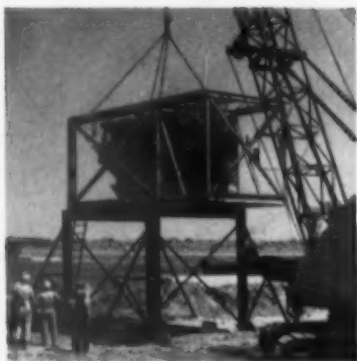
ROADS AND STREETS, June, 1959



See your distributor for details and fact-finding catalog . . . or write direct:

How portable, stack-up design speeds assembly of the AUTOMASTER-CA

On-the-job pictorial
report shows step-by-
step installation of
Johnson 1-stop paving
plant—watch it grow!



1 In one lift all batchers, dial scales, and plant control cabinet with mix selector and graphic recorder, are installed. All remain intact in this *single-unit* batcher section during plant assembly, disassembly, shipment. Control panel has plug-in connections to plant motors — no complex field wiring.



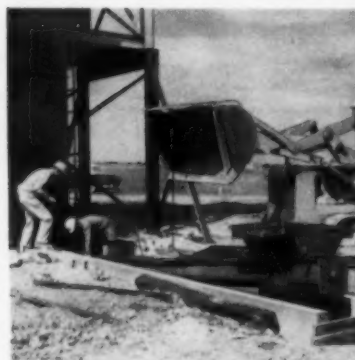
2 Next, the 4-material bin is set in place. It's a 2-section, all-welded unit with 3 equal aggregate compartments, and aerated cement compartment. Capacities: 100 cu. yds. agg. (150 tons @ 3,000 lbs. per cu. yd.) — and 145 bbls. cement (@ 4 cu. ft. per bbl.)

... for more details circle 339 on enclosed return postal card

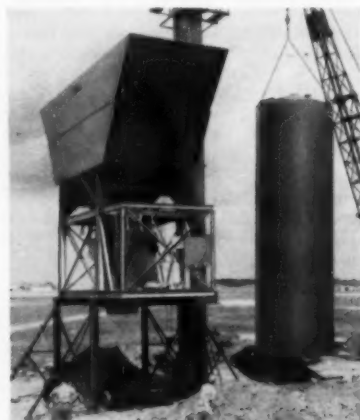
14



3 Up goes the cement elevator—all in one pre-assembled unit, complete with head platform, access ladder, safety cage, and 440-bbl.-per-hour chain-and-bucket line. 2-way gate, spouting provide quick hook-up to bin and silo.



4 An easy lift by front-end tractor-loader spots the undertrack screw conveyor in place at the elevator boot. Conveyor is conveniently arranged for mounting silo rotary plug valve — and railway or truck-receiving hopper.



5 And now, the silo is set up — an 8 ft. dia. 447-bbl. pre-fab unit, complete with built-in low-pressure aeration

system, high-low-level bin signals, rotary plug valve, etc. (829-bbl. 11 ft. dia. cement storage silo also available.) There you have it! A complete-package, one-stop automatic batch plant, set up in as little as 16 hours erection time. Everything pre-assembled into a minimum number of portable, easy-handling units — all widths 8 feet or less for truck transport. Maximum lift, only about 7½ tons. Next, check its production —



6 Bring on the trucks! Here's the Johnson® AUTOMASTER-CA in operation, weighing out a 1½-cu. yd. paver batch every 15 seconds. Easily handles maximum production for two 34-E pavers. Plant has *one* 14 cu. ft. (1,000-lb. scale) cement batcher — and three 38 cu. ft. (3,000-lb. scale) aggregate batchers with moisture compensators. All dial scales are mounted in pressurized cabinet containing heated, filtered air for extreme accuracy. Gates are air-ram operated with electric control, manual override. What's more —

12 pre-set mix selections are available at the turn of *one* dial! As each batch is discharged, graphic pen recorder registers exact weight of each material, with time and date, all on *one* chart. AUTOMASTER plants are available for any 1, 2, or 3-stop operation. Contact Johnson distributor, or write us.

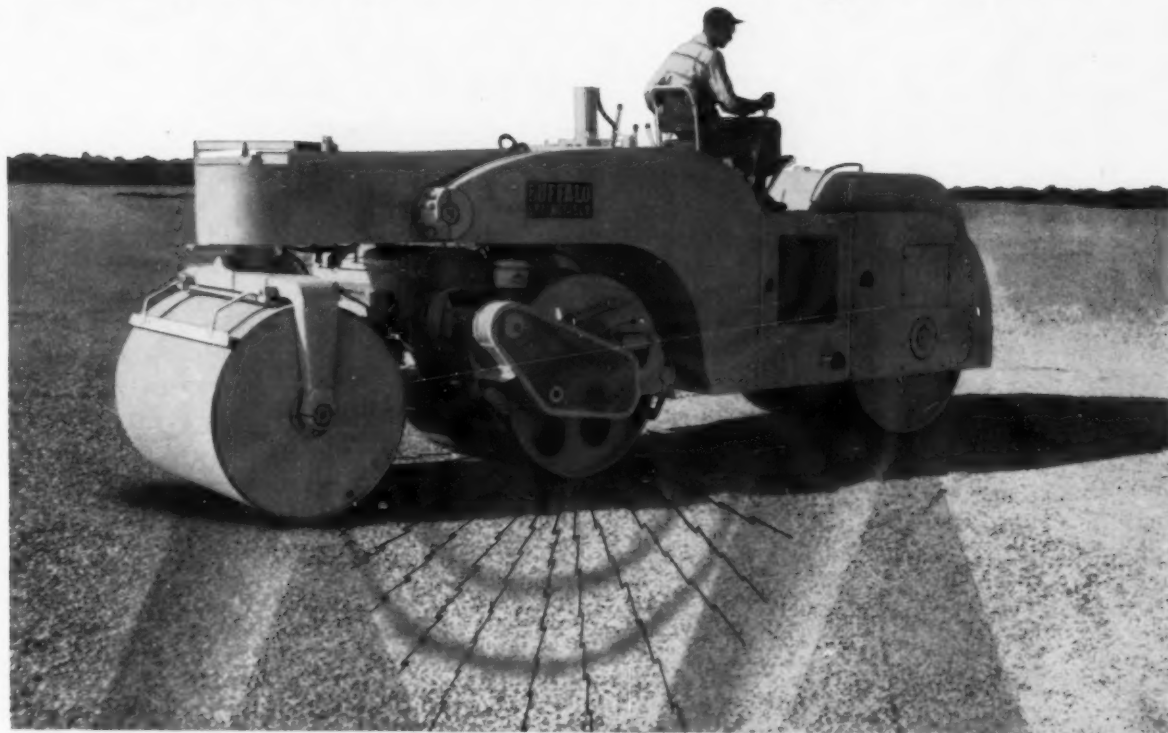


Champaign, Ill. • Stockton, Calif.

A Division of Koehring Co. 1902

ROADS AND STREETS, June, 1959

The inside story on vibratory compaction...



Full surface contact plus max. pressure are maintained at both ends of 15-20 ton roller

1,500 to 2,200 vibrations per minute are concentrated here ...within controlled area

No vibrations escape or dissipate beyond the "loaded" sub-grade soil columns

Center-roll vibration gives greater densities in deeper lifts of materials . . . fewer passes needed

All vibratory effort is exerted in a *downward* direction . . . and *concentrated within a confined ground area*. That's because the vibrating roll is in *center* position on this Buffalo-Springfield® KX-25EV 3-axle tandem. The vibratory action is accompanied by full surface contact at *both ends* of the big 15-20 ton roller. You get vibratory impact . . . plus heavy tandem roller compaction *all in one pass!*

A separate engine, mounted on sub-frame on center roll, transmits power through V-belts to an eccentric axle shaft. The eccentric shaft, running through the center roll, turns at high speeds, creates vibrating action on the roll. Regardless of vibrations per minute, center roll revolves freely to match roller travel speeds.

Over 100% density in 3 passes

At new airbase (above) 6-in. lifts of crushed bank-run gravel, mixed with mineral filler and slag, were compacted to over 100% density in not more than 3 passes. On other jobs, owners report outstanding re-

sults using a *segmented* guide roll, vibratory center roll, and smooth-faced drive roll.

Retains "walking-beam" feature

When vibrating action is not required, the independent power unit is merely turned off . . . and the KX-25EV becomes a standard 3-axle tandem with exclusive "walking-beam" compaction control. *And that's not all!* Hydraulic control raises the center roll, to operate machine as a long-wheelbase 15-20 ton 2-axle tandem. All this versatility in *one* roller can save time and money on your jobs. Let us show you how . . . with a demonstration. Call Buffalo-Springfield distributor or write us.



BUFFALO-SPRINGFIELD ROLLER CO.

SPRINGFIELD, OHIO

DIVISION OF KOEHRING CO.

PNEUMATIC TIRE • VIBRATORY • SEGMENTED ROLLERS • 2 AND 3-AXLE TANDEMS • 3-WHEEL ROLLERS • KOMPACTOR®

. . . for more details circle 338 on enclosed return postal card

ROADS AND STREETS, June, 1959



Dependable, big-capacity dump trucks are yours from GMC, Conventional and COE design, four- and six-wheelers with proved gas or diesel power.

This GMC pickup is just one of over thirty different capacity, body and wheelbase combinations. Choice of Six or V-8 power, 4-wheel drive or Powr-Lok.



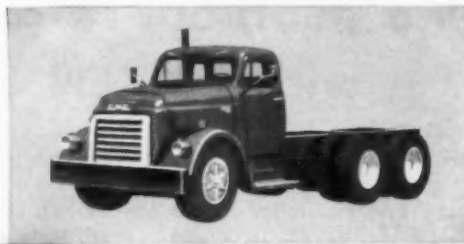
GMC Operation "High Gear" brings you construction trucks with the lowest prices, biggest loads, most economical power and longest engine life!

GMC Operation "High Gear"—the industry's biggest engineering, design and quality-control program—brings you today's most dependable trucks. They are built to increase your profits by drastically cutting your hauling costs. Your GMC Dealer can prove it.

GMC Truck & Coach—a General Motors Division.



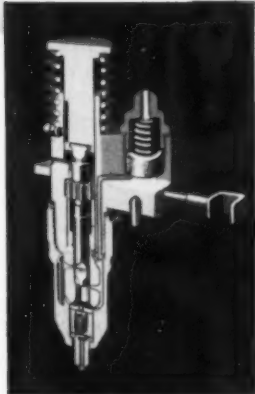
Lowest prices—This GMC 450 with tandem rear axle is the lowest-priced six-wheeler in the 35,000 lb. GVW class . . . saves you several hundred dollars. In addition, you get plus-value features throughout as standard equipment—proved, heavy-duty 6-cylinder engine, rugged frame and 7,000 lbs. capacity front axle.



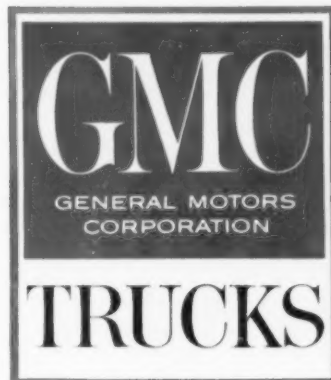
Biggest loads—GMC builds 13 special off-highway models to haul the biggest loads, up to 65,000 lbs. GVW. Here are a few examples of the built-in toughness that is standard—extra heavy-duty clutch, rugged straight-through frame and sturdier sheet metal.



Longest engine life—All GMCs are true-truck built, made to last. Engines with M-400 bearings that have 7 times longer life, rifle-drilled connecting rods assure positive lubrication. Cabs are sturdily reinforced for lasting service on the most rugged jobs.



Most economical power—This is the heart of the fuel system. GMC injectors that meter, time, inject and atomize the fuel. These, plus many other GMC "exclusives", make GMC 2-cycle diesel engines the most economical you can get.

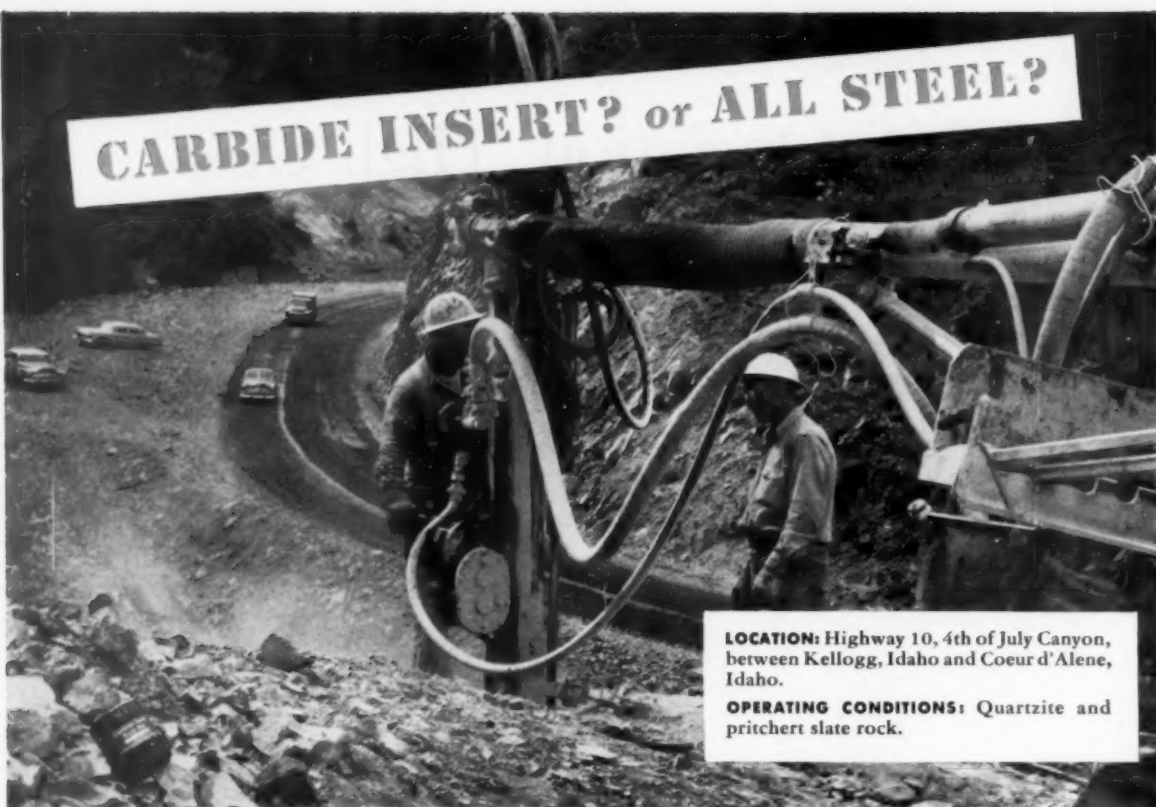


From ½-ton to 45-ton . . . General Motors leads the way!

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ROADS AND STREETS, June, 1959

CARBIDE INSERT? or ALL STEEL?



"We get more re-grinds per bit, lower cost with TIMKEN® carbide insert bits"

... Reports F. H. Slate and E. C. Hall Co.

IN constructing 7.2 miles of new four-lane highway in 4th of July Canyon between Kellogg, Idaho and Coeur d'Alene, Idaho, F. H. Slate and E. C. Hall Co. must drill through quartzite and pritchert slate rock. Using Timken® carbide insert bits, they average 12 to 14 re-grinds per bit, drill 20 to 100 feet of blast hole per pass. And with proper grinding, they use all of the carbide height with no fracturing of carbides when discarded. Bit cost per foot-of-hole stays at the minimum, production at the maximum.

Timken carbide insert bits are

your best bet, too, for drilling in hard, abrasive ground. But in ordinary ground, you should use Timken all steel multi-use bits. They're interchangeable in the same thread series. Without changing drill steels, bits can be changed quickly and easily as the ground changes.

All Timken rock bits are made from our own electric furnace fine alloy steel. We're the only American removable bit manufacturer that makes its own steel. And for even longer life, Timken bits have a specially developed shoulder union that protects threads against drilling impacts.

To get all these advantages and get the right bit for your job, call or write Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded all steel multi-use rock bit



Timken threaded carbide insert rock bit

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

your best bet for the best bit for every job

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ROADS AND STREETS

Sixty-Six Years of Editorial Leadership

Washington News Letter



Exclusive - by Duane L. Cronk, Director, Highway Information Services, Inc.

June 10, 1959

The consequences of a curtailment in the Interstate highway construction program were called sharply to the attention of Congress last month. A corps of highway experts - representing almost all the segments of the fraternity - told a House investigating committee that unless funds are found to keep the long-range effort in high gear, the results would be disastrous. Highway officials testified that contract awards would be cut to a trickle and their engineering staffs would be decimated. Industry representatives asserted that contractors, equipment manufacturers and materials producers would suffer demoralizing losses. Municipal interests reported that failure of Congress to keep the program rolling would prove "a very damaging blow" to urban renewal.

The Congressmen, members of the House Public Works Committee, were ostensibly meeting to glean sentiments on Congressman George Fallon's proposal to extend the Interstate apportionment at the \$2.5 billion level in 1962 and to continue distribution to the states on the "needs" formula. But it was obvious that the legislators, entertaining no fears for the passage of this measure, were deeply concerned about a more pressing problem - that of finding more money for projects on the 41,000-mile Interstate network.

(The 1956 Act - which created the 13-year roadbuilding program - did not earmark enough highway user taxes for the Highway Trust Fund to meet expenditures on a year-by-year basis. Congress delayed the solution last year by merely waiving the Byrd Amendment and later by authorizing a \$400 million anti-recession outlay out of the fund in '59. The compound result: There will be no money in the Highway Trust Fund to make an apportionment this summer, although \$2.5 billion was originally authorized, and only \$500 million next year, instead of the \$2.5 billion expected.)

* * *

The impact upon most state highway departments would be immediate, Ralph Bartelsmeyer, chief engineer of the Illinois State Highway Department and president of the American Association of State Highway Officials, reported. Within a year, 37 states will have been forced to stop awarding Interstate contracts. Those which have gone ahead the farthest will be hard-hit at once. Ohio is already at the point where all available federal funds have been put to work. Within a couple of weeks, California, Connecticut, New York and Vermont will be able to award no more contracts. And other states will reach the same point in rapid succession.

Thirty-two states will have to dismiss engineers and technicians, recruited and trained at great effort, if the 1961 apportionment is not made, Mr. Bartelsmeyer said. In these and other states, the impact would fall directly upon private en-

(continued on next page)

gineering organizations carrying a large share of the Interstate design work load.

It would take a year to get the wheels rolling again after a shut-down, Mr. Bartelsmeyer pointed out. A two-year curtailment would actually produce a three-year delay in the Interstate program. In short, he summed up, if this vitally needed and mammoth program were to be interrupted, many projects would be left in a stage of partial completion "for a considerable time." And in many of the large urban areas, "a chaotic condition" would exist.

* * *

Cityside, the effects of a moratorium on the Interstate program would be just as disastrous, a leading municipal leader testified. Glenn Richards, commissioner of public works for Detroit and chairman of the Highway Committee of the American Municipal Association, told the Congressmen that half the Interstate program - dollar-wise - is for urban areas. Numerous cities have tied their plans for urban renewal and industrial development to specific Interstate expressway projects. To dead-end those projects for a couple of years would be to frustrate and disrupt other vital urban programs, he said.

Those who are urging economy might well consider that highway construction is "probably the best buy that the public gets for its tax money," The Associated General Contractors of America told the committee. M. Clare Miller, president of the San Ore Construction Company, McPherson, Kansas, and an official in the AGC Highway Division, reported that during the past year construction costs have inched up only 0.3%. This, despite the fact that wages climbed 4.5% and equipment prices went up 3.4%. .

* * *

It should be a federal offense to bomb equipment on federal-aid highway jobs, a contractor representative told Congress last month. Orville W. Crowley, secretary of the AGC of Iowa, described six unsolved bombings of construction sites and equipment before a House investigating committee last month. Not a single arrest has been made in the three-year interval, he said, although the chapter has offered \$15,000 reward money in two cases. It is obvious that local authorities need FBI assistance.

\$250,000 worth of damage resulted from the six crimes, Mr. Crowley testified. There are 33 anti-bombing bills now pending in Congress.

Engineering consultants are fighting for their stake in the highway program. Last month the Consulting Engineers Council meeting in New York City voted a public relations program to publicize the contribution of the consultant. In Washington, D.C., the Engineering Division of ARBA, sought a strengthening of the organization's position advocating the widest logical use of private firms in the highway program. The ARBA unit has developed a new fees report and is now working on a model contract agreement for use of consultants and highway officials.

* * *

Construction projects are now to be included in the program of "set-asides" directed by the federal Small Business Administration. The SBA, which is supposed to screen government contracts and set aside a certain amount for small business, has long sought to extend its activities into the roadbuilding field. It has kept the Bureau of Public Roads under pressure to encourage a flow of small contracts.

ARBA Presents the Case for the Road Building Industry

Out of the welter of facts and figures given to Congressman Fallon's committee last month, one testimony stands out as of special interest to the roadbuilding industry. In a clear and forceful brief, General Louis W. Prentiss, executive vice president of the American Road Builders Association, documented the case for the roadbuilding industry. This special report on ARBA's testimony is presented, not only because of the pertinence of the appeal made on behalf of the industry for continuation of the Interstate program, but also because of the insight it gives on the capacity and drive of one of the nation's most dynamic industries.

The roadbuilding industry has accomplished a notable expansion program, Gen. Prentiss reported. Just about three years ago, the U.S. Congress authorized a 13-year highway construction program. The roadbuilding industry was asked to expand its productive capacity as quickly as possible to reach a level of \$2.5 billion worth of new Interstate roads a year. This was done. Gen. Prentiss described that "gearing up" accomplishment with such examples as these:

- The capacity of cement plants has been increased 35 percent since the start of 1955. Structural shape mills have been boosted from 7 million tons (in 1957) to 8 million tons.
- The production of welded wire fabric has been increased to 8 million tons. Since 1956, there has been a 20 percent increase in the capacity of producers of corrugated metal pipe and a 100 percent increase in capacity for the production of guard rail, structural plate pipe and pipe arches. Plants producing such items has increased from 409 to 504.
- Prestressed concrete production has been greatly stepped up by popularity of that type of design. The first U.S. plant started production in 1950. By the end of 1957, there were about 260 producing plants in operation.
- The asphalt industry has demonstrated its ability to expand swiftly and even now, it is estimated that the industry is capable of handling many times the current volume.
- Private consulting engineers have built up their organizations to carry a record volume of work. (In fact, consultants have already performed nearly 40 percent of the nationwide engineering load.)
- At the same time, contractors' capacity has increased \$600 million a year. They are now working at only 62 percent of their total capacity.

It is against this background of expansion of many individual firms, and, in fact, the entire industry, that one can recognize how a cut-back in the Interstate program would be "disastrous," Gen. Prentiss pointed out. Because of such tremendous investments (undertaken largely on confidence in Congressional "intent"), the consequences of a reduction in the program would be "most serious," he said. For example:

(continued on next page)

Labor: A slow-down in the effort, even to a level of \$555 million in 1961-62 would result in the loss of 1.4 million man-hours of employment a year. Taking \$2.33 per hour as the average, the loss to the economy would be \$2.54 billion.

Contractors: Some contractors are seriously short of financial reserves. "A cut-back in the program would certainly result in bankruptcies and it is impossible to say exactly how many contractors would be forced out of business by a \$3 billion reduction in the amount of contract construction," General Prentiss said.

Machinery Manufacturers: Equipment manufacturers would be hard hit by such a move. Nearly 36 percent of their total output is dependent upon demand from the highway industry. Firms specializing in the manufacture of road equipment will certainly find their market drying up. "It is doubtful that some of these companies will be able to weather the storm," he said.

Materials Suppliers: Producers would be hurt, too, by an untimely slow-down. In the case of asphalt, the General said, 70% of total capacity is in the highway field. A cut-back in Interstate paving projects would mean the loss of a market for 1,265,000 tons of asphalt. This could well force the shut-down of 100 asphalt refining plants. Such a blow would put 10,400 men out of work in the asphalt industry.

* * *

About 24% of all portland cement manufactured in the U.S. is now being used for highway construction. The impact of an interruption would be felt in this industry at once, with particular severity in the prestressed concrete field.

Normally, 12% of structural steel capacity is used for highway purposes. However, since the demand of other industries for these items has fallen off, and bridge work is sharply up, the highway program now constitutes 25% of this market.

It has been estimated that an expenditure of \$100 million in highway construction eventually produces business transactions totaling \$316 million. Likewise, a significant reduction in such activity would ricochet throughout the economy provoking much more distress than might be assumed.

* * *

There should be no doubt in the minds of the Congressmen who heard such testimony that a curtailment of the big Interstate program would create innumerable hardships. Highway leaders are hopeful that the preponderance of evidence presented will carry the drive for funds over the very formidable obstacles ahead. President Eisenhower is adamant for an increase in the federal gasoline tax as the only means of bolstering the Highway Trust Fund. In a special message to Congress last month, he turned thumbs down on several of the plans by which Democratic Congressmen have hoped the deficit could be met.

The lines are clearly drawn, and to the dismay of roadbuilders it appears the continuation of the National Interstate program will be a major point of conflict between the Republican Administration and Democratic Congress. It could be noted that our nation has benefited from nearly four decades of sound highway development because the federal road aid historically has been kept from becoming a political football.

B.F. Goodrich



B.F. Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F. Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F. Goodrich Rock Service tires on belly dump trucks (above).

B.F. Goodrich builds the Rock Serv-

ice for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F. Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F. Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F. Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F. Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F. Goodrich

is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F. Goodrich Co., Akron 18, Ohio.*

Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment



B.F. Goodrich *off-the-road tires*

ROADS AND STREETS, June, 1959

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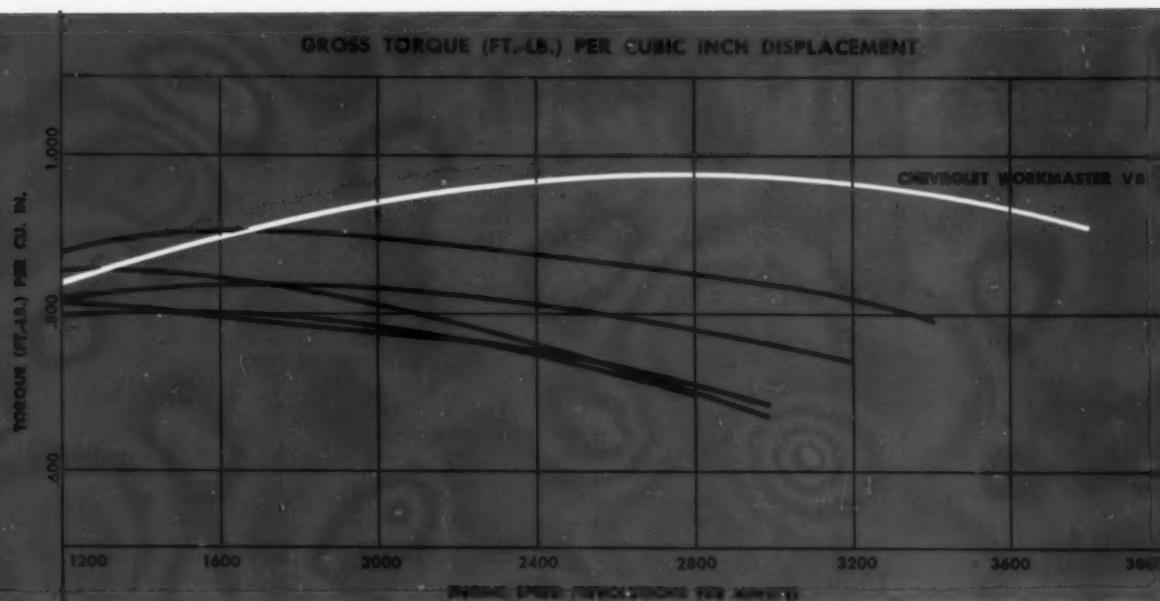
It's torque
that beats
tough jobs,
and this
engine
has it
to spare!



CHEVROLET'S 348-CUBIC

It's torque you need in a big-truck engine. Torque that gives the truck plow-horse pulling ability at low speeds . . . torque that assures the power to keep big loads moving, whether it's through the rough or over the road. And Chevrolet's 230-h.p. Workmaster V8, with efficient Wedge-Head design, short piston stroke and the right kind of valve timing, puts out a brand of torque that's made to order for your toughest big-tonnage hauls.

No job's too tough for a



Here's proof that Chevrolet's 348-cubic-inch Workmaster V8 puts out plenty of torque—all the pull and power you'll ever need for your high-tonnage hauls. The white curve above shows that the Workmaster provides high torque throughout the *entire range* of operating speeds; that it puts out high torque at low r.p.m.'s where you need it for tough off-road situations, maintaining high torque right up to governed speed. The black curves on the above graph represent the torque output of typical heavy-duty 6-cylinder engines of between 330 and 390 cubic inches of displacement. (Each of the above curves demonstrates actual torque output efficiency, on a basis of gross foot-pounds of torque per cubic inch of displacement.)

348-CUBIC-INCH WORKMASTER V8

Among today's big-truck V8's, Chevrolet's 348-cubic-inch Workmaster is outstanding for its ability to produce extra foot-pounds of work-whipping torque. This high torque output is the natural result of the Workmaster's unique design characteristics. Short piston stroke and large piston area, for example, comprise a torque-producing advantage, and *this engine provides the shortest stroke in its class.*

Advanced Wedge-Head design, with its fully machined combustion chambers, means high torque, too. It assures high turbulence of the fuel-air mixture and balanced power output from each cylinder. The Workmaster V8 has high volumetric efficiency . . . takes in the fuel-air mixture *efficiently* at all speeds. This, combined with a camshaft design that gives just the right valve lift and timing, assures high torque—extra pulling power to get you through the tough spots!

And this engine is designed for *durability* as well. Tough Moraine-400 bearings, for instance, last up to 7 times longer than ordinary bearings. Stellite-faced, high alloy exhaust valves resist wear. Tough induction-hardened crankshaft journals last longer . . . Rotocoil exhaust valve rotators increase valve life by as much as 300%.

For these reasons and many more like them, the Workmaster is a solid performer—a sure answer to extra savings on big-tonnage runs. Now *standard equipment* in all Chevrolet Series 90 and 100 trucks, it powers G.V.W.'s up to 25,000 lbs. and G.C.W.'s up to 48,000 lbs. . . or, in Series 100 tandem models, G.V.W.'s up to 36,000 lbs., G.C.W.'s up to 50,000 lbs. For the kind of torque and toughness you need to do big jobs better, see your Chevrolet dealer about a Workmaster V8! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Chevrolet Truck!



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ROADS AND STREETS, June, 1959

Personals



George J. Thormyer

GEORGE J. THORMYER, recently retired chief engineer of the Ohio department of highways, has joined Photronix, Inc., of Columbus, Ohio. He will serve as executive vice-president of this photogrammetry

and electronic computation firm, and act as assistant chief engineer of its associated consulting firm, Barrett Associated Engineers.

ZEB STEWART has retired as division engineer, North Carolina state highway commission, after 38 years of service with this organization. He will join the W. E. Graham Construction Company, contractors of that state.

H. H. HARRIS has been appointed administrative assistant to the commissioner, Virginia department of highways. He succeeds the late R. P. Ellison. Harris was maintenance engineer and more recently assistant chief engineer.



Col. W. Dixon Smith

ham, Alabama, as staff hydraulic engineer is announced by J. E. Bunchanan, president of The Asphalt Institute. Col. Smith has served successively as department director of the Engineer Research and Development Laboratories at Fort Belvoir, Va.; and as chief of the Engineering Section, Army Field Forces, at Fort Monroe, Va.

Asphalt Institute Adds Hydraulic Specialist

The appointment of Col. W. Dixon Smith, USA (ret.), of Birming-



Model 5912-T7.
12 volt system, transistor/neon, 7" head. List price \$64.00.

*Something New
in Warning Flashers!*

Western Representative:
Signal Flash Co.
1108 Raymond Way
Anaheim, Cal.

... for more details circle 348 on enclosed return postal card



Model 5912-T360.
12 volt system, transistor/neon, 4" diameter, 360 degree lens. List price \$64.00.

NORSICO
Signal Flash

WARNING FLASHERS

After much investigation, Northern Signal engineers have successfully combined the stability and long life of the neon tube with the revolutionary advantages of the transistor (circuit patents pending). These good qualities are now offered in SIGNAL-FLASH series 5912 lights — high intensity lights that set a new high standard in warning impact from dry battery power. In contrast to the usual "twinkle" of neon light flashers (which are adequate for slow moving traffic) the commanding signal from SIGNAL-FLASH 5912 lights is a new and satisfying experience. A flash duration of approximately 90 milliseconds has been adopted as standard. These new lights have given very satisfactory service on some of Wisconsin's high speed highways. 5912 series lights operate from a standard 12 volt dry battery. Battery life, in uninterrupted service, is 4 weeks minimum at an ambient temperature of 60 degrees Fahrenheit, nominal. At this termination point, approximately 35% of the original light value is available. Descriptive data is available at your request.

NORTHERN SIGNAL CO. SAUKVILLE, WISCONSIN

ROADS AND STREETS, June, 1959

New Cities Service C-300 WORLD'S NEWEST MOTOR OIL—

**Amazing cold-engine sludge protection...
Drastically reduces hot-engine varnish!**



This heavy-duty sock type filter was removed from a gasoline engine after a severe test under low temperature conditions using new C-300. This cold-engine service is extremely conducive to the formation of sludge due to water condensate. But notice that the filter is only slightly discolored from the oil... filter is still in perfect operating condition. New C-300 more than doubles filter life!

This filter was removed after identical service using a high quality Supplement 1 oil with conventional additives. Heavy "shoe polish" sludge has completely clogged filter. The filter can be replaced but this is just a sign of the inside condition of the engine. This sludge clogs oil rings and causes compression ring sticking that results in excessive oil consumption and increased engine wear and operating costs.

IDEAL FOR BOTH GASOLENE AND DIESEL ENGINES!

Modern motor oils came of age during the war years when detergent additives were introduced to permit the operation of high-output diesel engines. However, these engines operated at sustained high speeds and high temperatures while construction work often calls for intermittent, if not substantial, cold-engine operation.

Cities Service now introduces the new C-Series oils that not only give superior hot-engine protection, but for the first time, prevent the sludge that clogs valve lifters and filters, causes sticky rings and wastes

gas and oil during cold-engine operation.

Ideal for diesel and gasoline engines, new C-300 has an extremely high detergency level... highly inhibited against oxidation... prevents sludge and varnish... contains a special anti-wear additive... stops rust and corrosion... in short, it's the most remarkable development in fleet motor oils in the last decade. Have a Cities Service Lubrication Engineer call with the full details on new C-Series oils; or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



The key to this remarkable performance is "dispersancy." Above you see a photomicrograph of a conventional Supplement 1 oil after 1800 miles of use. Compare this with the enlargement of used C-300 below. These particles are less than *one-tenth the size*. Finely divided dispersed material remains in the oil while bigger particles settle out.



CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

ROADS AND STREETS, June, 1959

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25

SUPERIOR HIGHWAY SEALANT



ALLIED

Jet Seal

- 9015H has no flow—even at elevated temperatures (200°F)
- Will prevent penetration of water into joints
- Is highly resistant to highway salts
- Will prevent incorporation of incompressible materials
- Has positive adhesion, cohesion, resilience and ductility at low temperatures (-20°F)
- Is simple to apply, with the exclusive Applicator, originated by Allied.
- Is economical and durable
- Is quick curing at all temperatures—can be opened to all traffic in one hour

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS
AND COMPOUNDERS OF
SPECIAL ASPHALT PRODUCTS

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39th St. Station • Oklahoma City 12, Oklahoma
Plants: Stroud, Okla. • Detroit, Mich. • Los Angeles, Calif.

Write for further details: Product 9015H.

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Cover Scene

The cover picture this month shows a commonplace scene, that of putting a rear wheel on a rear-dump. The location: the Cross Westchester Expressway project near White Plains, N. Y. Contractors: Rusciano & Del Balso.

This tire changing job was routinely handled. The trick which the camera missed occurred a moment after this snapshot was clicked. A truck was driven slowly against the tire, and its bumper used to push the wheel in on the hub.

Green Roads Suggested

Green highways with a yellow divider line are recommended by an eye specialist as a means of relieving eye strain to drivers and thus eliminating a source of dangerous fatigue.

Dr. Alden N. Haffner, executive director of the Optometric Center in New York, made this suggestion in a day-long symposium on motorists' vision and highway safety in New York recently.

CHARLES W. COOK JR., an attorney, has been appointed executive director of the Indiana Toll Road Commission, succeeding Albert J. Wedeking. Mr. Cook was formerly general counsel for the Commission.

Mr. Wedeking has rounded out a quarter century of Indiana service practically all in highway or toll road work. He headed the Commission during the construction of the \$280 million project and was for sixteen years a member of the state highway commission of Indiana, twice its chairman.

DANIEL O. CARGILL has been named chief engineer of roads and bridges, Rhode Island department of public works. He succeeds George H. Henderson who has announced his retirement.

Samuel A. Engdahl, a veteran of 30 years has been named to a top position in the bridge section, formerly occupied by Cargill.

IMPROVING THE WATER REPELLENCY OF HARDENED CONCRETE. Bulletin 197, Highway Research Board, 2101 Constitution, Washington, D. C. Price \$0.50.

The bulletin contains two papers presented at the 37th annual meeting of the Board.

ROADS AND STREETS, June, 1959



New International 560 handles backhoe buckets up to 8.9 cu ft, up to 2 feet wide . . . does own backfilling with front-end loader. Save expense of short-haul truck and trailer transport by self-powered job-to-job moves!

Backhoe-loader combination: International Pippin

1/3 cu yd bite ... on rubber!

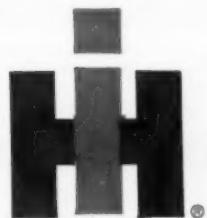
New International® 560 tractor

Put more than 3 tons of built-in brawn plus tremendous hydraulic down-pressure behind a 1/4-yard bucket . . . the 72.5 hp* International 560 delivers *irresistible* force for digging more than 13 feet deep on the toughest trenching assignments!

You match . . . even outdig . . . single-purpose machines because of job-to-job mobility to handle small-yardage jobs that higher-priced, specialized rigs can't afford to touch. You get double-duty from the husky gasoline, diesel or LP Gas power plant, too, with the big capacity front end loader.

Ask your IH dealer to demonstrate the big, burly 560 . . . or others in the complete International wheel tractor line, 13.4 to 90 hp*. For free catalog, or name of your IH Dealer, write International Harvester Co., Dept. RS-6, P. O. Box 7333, Chicago 80, Ill.

*Maximum flywheel hp

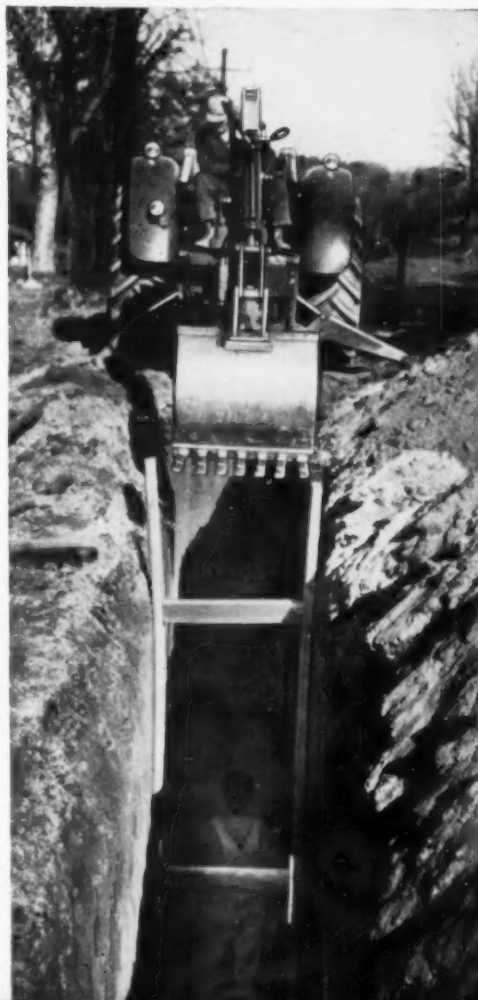


See your

**INTERNATIONAL
HARVESTER dealer**

International Harvester Products pay for themselves in use
—Farm Tractors and Equipment . . . Twins . . . Commercial Wheel
Tractors . . . Motor Trucks . . . Construction Equipment—General
Office, Chicago 1, Illinois

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Tough Job Tests Machine Efficiency...

CONTRACTOR CONVINCED ALLIS-CHALMERS COMBINATION IS BEST CHOICE

St. Paul, Minn.—Loading rock-laden, sandy clay—then spreading in swampy muck and loose sand provides a real test of earth-moving efficiency. Kimmes-Bartelma Construction Company applied its Allis-Chalmers fleet to just such conditions on a 1,900,000-yard segment of St. Paul's new freeway system. The Hastings, Minnesota, contractor's TS-360

motor scrapers with HD-21 pushers handle the demanding job faster and at lower cost than any other combination of machines available, partner Charles Bartelma reports. He thoroughly tested three other well-known makes—convinced himself that his Allis-Chalmers fleet is the best choice.

Kimmes-Bartelma is handling the clearing, grading and sub-base preparation on a 2.9-mile section of the north approach to the proposed St. Paul freeway (trunk highway 35-390). Work on the \$1,469,000 contract

started in October, 1958, and the job is expected to be completed by July, 1959. Approximately 10% of the 1,900,000 yards of excavation is swamp work. Dragline-loaded, tractor-drawn scrapers haul out the muck

... motor scrapers bring in sand fill ... tractor-dozers spread it into the mucked-out areas where it is compacted to specifications.

The motor scrapers get a workout on both ends of the haul. The dead, rock- and sand-laden clay is tough to load ... yet the TS-360's, with assists from torque converter HD-21's, get good loads in 30 to 35 seconds. At the other end of the haul, the scrapers spread in soggy, mucked-out swamp holes. Even as the fill progresses, loose sand slows spreading.

A compensating factor, however, is the finely dressed haul road maintained by an Allis-Chalmers FORTY FIVE motor grader. The excellent condition of the haul road permits scrapers to highball the 2,300-foot



Sylvester Kimmes, partner
Kimmes-Bartelma Construction Company
Hastings, Minnesota



Charles Bartelma, partner
Kimmes-Bartelma Construction Company
Hastings, Minnesota



Allis-Chalmers TS-360 with HD-21 pusher gets good loads of dead, sandy clay in as little as 30 seconds.



Much of the credit for excellent cycle time goes to the Allis-Chalmers FORTY FIVE motor grader which keeps haul roads in top condition.

...move ahead with

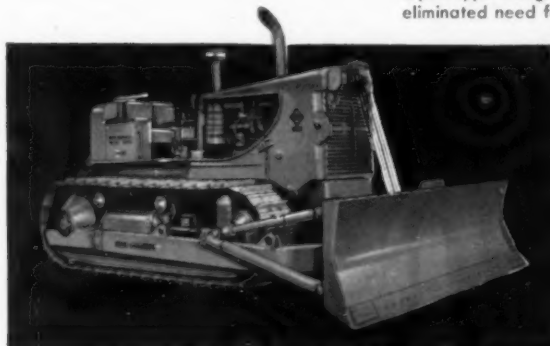


Allis-Chalmers tractor-dozers push fill into swamp holes which had been mucked out by tractor-scrapers and draglines.

haul . . . cut average cycle time to 3 minutes, 33 seconds. Bartelma calls this good time in *any* conditions . . . *excellent under those prevailing on this job.* "The low, wide bowl makes loading easy and the forced ejection gets all material out in a hurry," he said. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.



Open-type design of these Allis-Chalmers pull scrapers permitted dragline loading of muck eliminated need for special added equipment.



HD-21

225 net engine hp Torque converter drive
56,260 lb approx. as shown



TS-360

20-yd capacity 280 horsepower
49,050 lb



ALLIS-CHALMERS...power for a growing world

. . . for more details circle 277 on enclosed return postal card

ROADS AND STREETS, June, 1959



MAGINNISS SIDE FORM VIBRATORS

*For any hydraulic
self-widening or telescoping
concrete Finisher or Spreader*

By using the MAGINNISS hydraulically operated Side Form Vibrator attachment, you will get sound, dense concrete next to side forms—prevent honeycomb—eliminate the need of hand labor—and lower costs on your concrete paving jobs.

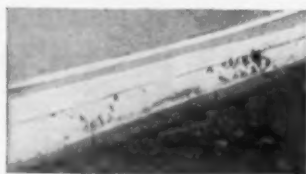
The MAGINNISS Vibrator attachment includes two Hi-lectric motor-in-head Vibrators, each spring-mounted on a separate shaft and hanger. As the width of the finisher or spreader is varied, the vibrator units automatically adjust with the change. Depth and angle of both vibrator heads are hydraulically controlled by a single lever.

MAGINNISS motor-in-head Vibrators are fully submerged in and cooled by the concrete. They provide uniform INTERNAL vibration to assure a homogeneous mixture of aggregate and mortar along the forms from base to surface in slabs 2" to 36" thick. These Vibrators can be mounted as much as 15 inches in from the side form and still vibrate concrete effectively enough at the forms to eliminate honeycomb.

There are no cumbersome flexible shafts or external drive motors. MAGINNISS Vibrators are powered by a MAGINNISS 120 volt, 180 cycle gasoline engine driven generator mounted on the spreader or finisher.

Ask your MAGINNISS Distributor for all the facts. You'll find him listed in the Yellow Pages under "Contractors' Equipment" in 85 principal cities.

Find your nearest
distributor in the
'Yellow Pages'



Actual photo showing honeycomb left in slab before Maginniss attachment was installed.



Photo of slab on same job showing dense, sound concrete consistently produced by Maginniss Side Form Vibrators.



MAGINNISS

POWER TOOL COMPANY

for Literature write Dept. RS-69

154 Distl Avenue

Mansfield, Ohio

... for more details circle 347 on enclosed return postal card

New Publications

Progress Report on Highway Cost Allocation

The "Third Progress Report of the Highway Cost Allocation Study," submitted to the Congress by Secretary of Commerce Lewis L. Strauss on February 27, 1959, has been printed as House Document No. 91, 86th Congress, 1st Session. The study was undertaken by the Bureau of Public Roads pursuant to the requirement of Section 210 of the Highway Revenue Act of 1956.

The purpose of the study is to make available to the Congress information on the basis of which it may determine what federal taxes should be imposed, and in what amounts, in order to equitably distribute the tax burden among various classes of highway users. The final report of the study is to be completed in January, 1961.

The Report is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., at 35 cents per copy.

Available from the same source is the 131-page First Progress Report, dated February 28, 1957, which presents background material and a statement of the problem and plans for the study (35 cents per copy).

WELDED WIRE FABRIC REINFORCEMENT IN ASPHALTIC CONCRETE OVERLAYS. By Edward M. Howard, Field Engineer, Wire Reinforcement Institute, Incorporated. A practice review published as Technical Bulletin No. 238 (1959), American Road Builders' Association, World Center Building, Washington 6, D. C. Single copies available free on request to ARBA members, price 50c to others.

LEGISLATIVE PURPOSE IN HIGHWAY LAW; AN ANALYSIS. Special Report 39, Highway Research Board, 2101 Constitution Avenue, Washington, D. C. Price \$4.00.

A valuable reference for highway planners and administrators prepared by the Board's Committee on Highway Laws, Lewis R. Morony, chairman, and David R. Levin, secretary.



Truck operators derive many worthwhile benefits through the use of Eaton 2-Speed Axles—ability to pull out under full load, quicker trips, safer operation, reduced driver fatigue, longer truck life, greater trade-in value.

But a big reason why more and more truckers in all fields of heavy duty hauling are specifying Eaton 2-Speed Axles is that this equipment effects important reductions in operating and maintenance costs—which is another way of saying: they add to profits!

Ask your truck dealer to show you how Eaton 2-Speed Axles can make big savings in your hauling operation.



More than Two Million
Eaton Axles in Trucks Today.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps
Truck and Trailer Axles • Truck Transmissions • Permanent Mold Iron Castings • Automotive Heaters and Air Conditioners
Fastening Devices • Cold Drawn Steel • Stampings • Forgings • Leaf and Coil Springs • Dynamatic Drives and Brakes
Powdered Metal Parts • Gears • Variable Speed Drives • Speed Reducers • Differentials • Centralized Lubrication Systems



**the tractor that thinks for you Automatically
selects the right power ratio for any load or strain!**

Just one of the many job-time and man-hour saving features of the modern Eimco 105 is the exclusive torque converter-Unidrive team, the only drive and transmission that is engineered with oil cooled, positive engagement clutches that never . . . really never . . . need adjustment. No master-clutch to wear out! No clutch pedal to push! No gears to shift!

You get a smooth, powerful drawbar pull or push that adjusts automatically, through an unlimited number of ratios, to the load and strain . . . even if the tractor is at a standstill! The Eimco 105 engine will never stall through the torque converter.

And you get all the other exclusive Eimco 105 features too . . . upfront full visibility operator location; dual final drives that set a new standard in maneuverability; simple controls that increases work efficiency and output.

Let an Eimco sales-engineer demonstrate the many advantages of the modern Eimco 105. Contact the sales office nearest you or The Eimco Corporation, P. O. Box 300, Salt Lake City 10, Utah.



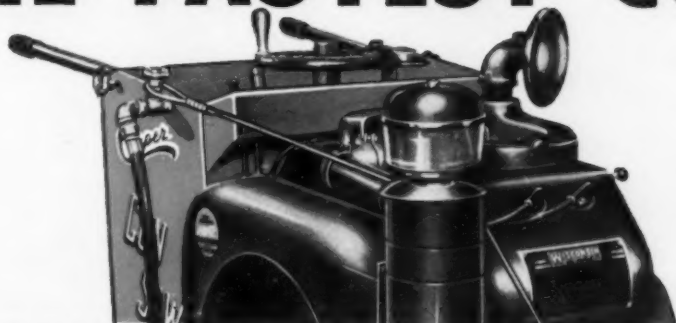
THE EIMCO CORPORATION • SALT LAKE CITY, UTAH

EXPORT OFFICE, 51-52 SOUTH STREET, NEW YORK, N. Y.

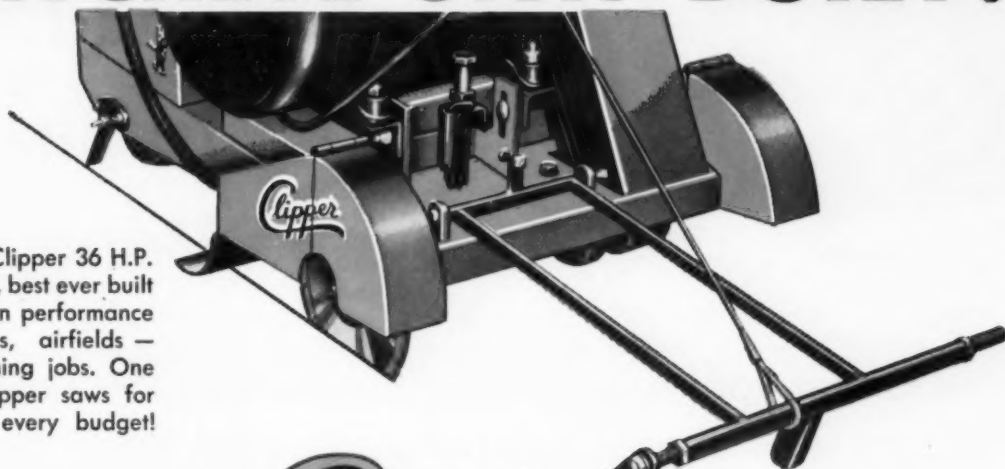
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

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THE FASTEST CUTTING



CONCRETE SAW BUILT!

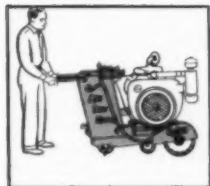


The rugged Clipper 36 H.P. Model C-363, best ever built for production performance on highways, airfields — heavy trenching jobs. One of many Clipper saws for every job — every budget!

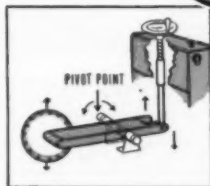
AND HERE'S HOW



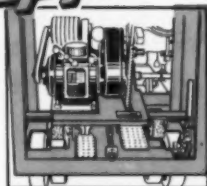
BUILDS THEM ...



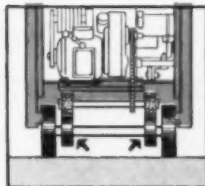
Our engineering staff really outdid themselves with Dual Balance Design—which simply means that this Big Saw is so perfectly balanced that one man can easily handle it. The engine weight is over the blade, preventing blade "ride-out". It's easier to use than any other saw—another reason why 4 out of 5 Buy Clipper!



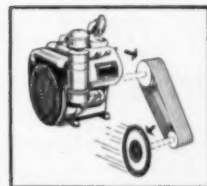
Only the most accurate blade feed was good enough for us, so we originated Ball Bearing Positive Screw Feed... which gives you positive control of the blade at all times... and enables you to keep abrasive blades at the proper cutting depth as they diminish in diameter. No other method... not even hydraulic... gives such complete blade protection.



We bring you the most powerful Heavy Duty Transmission ever used on a concrete saw. To it we've added abrasive coated drive wheels (ours only) which transmit smooth continuous power and propels this rugged saw through the toughest jobs at speeds up to 26 feet per minute. Another reason why it's the fastest saw ever built!



Solved! The problem of curing compound buildup on the drive wheels. We added two Separate Contact Wheels which never touch the pavement and operate right off the transmission drive wheels. Result? Continuous operation without downtime for wheel clean-up. A good example of our experienced know-how, which means more practical, efficient equipment for you.



Selection of component parts gets the same intelligent thought given the design of Clipper Saws. That's why we chose the dependable proven 36 H.P. Wisconsin Engine, then added 6 reinforced V-Belts to give 100% sure power delivery. That's why we can guarantee that no other saw can match Clipper!

ONLY CLIPPER CONCRETE SAWS ARE ... Unconditionally Guaranteed TO CUT FASTER—HANDLE EASIER and GIVE MORE FOOTAGE PER BLADE THAN ANY OTHER SAW!
THE CLIPPER MANUFACTURING CO. — 2820 Warwick — Kansas City 8, Missouri
 Sold direct from Clipper offices and warehouses coast to coast. • Call your Factory Trained Representative for Free Demonstration.

... for more details circle 297 on enclosed return postal card

Bearings...



Oil... and How to Save Money

The longer your engines run before need of overhaul—the less your cost of operation. Sinclair Tenol® Motor Oils have earned the reputation not only for giving long bearing life, but also for resisting the formation of harmful carbon deposits. Tenol Oils slash down-time and maintenance costs. Next time management asks how you've cut costs, tell them you've switched to Sinclair Tenol—and show them the results.

Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.

Sinclair ***Tenol® Motor Oils***

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Cedarapids Model H plants cost less to buy! Yet their low initial cost includes every quality-benefit found on popular G-Series plants except built-in running gear and self-erection. Running gear can be added, when desired, to all five H-Series models.

Want lowest cost per ton?

buy Cedarapids
Built by IOWA



The Most Precise Batching Controls on CEDARAPIDS MODEL H ASPHALT PLANTS mean extra batches per hour

How much do two or three extra batches per hour mean to your profit picture . . . especially when you get this additional output consistently, and with *no* additional maintenance or operating costs over slower, smaller-capacity plants? You're right! Cedarapids all-automatic bituminous mixing plants *do* cut your cost per ton to put extra profit in your pocket! It will pay you to get the full story about Cedarapids automatic operation that has been job-proved for 14 years. Ask your Cedarapids Dealer about the many other Cedarapids quality-benefits you get with both the portable stack-up H-Series and the 100% portable G-Series models.

IOWA MANUFACTURING CO. Cedar Rapids, Iowa, U.S.A.

By its precise timing operation, the exclusive Cedarapids "Mixer Minder" (top panel above) controls each step of the batching cycle to shave valuable seconds off cycle time and permit production of extra batches per hour. The automatic weigh controls (bottom panel) are correlated with the timing action of the "Mixer Minder" to draw pre-set weights of aggregates and bitumen into the pugmill mixer. The precision of Cedarapids automatic controls permits meeting specifications, cycle after cycle, without variation.

More Cedarapids
Bituminous Mixing Plant
Benefits that
Reduce Your Cost per Ton

✓ Fast-acting, air-operated bin gates, designed with large, unobstructed openings, prevent bridging, binding or sticking. More aggregate is discharged into the batcher in less time.

✓ Aggregate batcher discharge gates run the full length of the pugmill mixer. When gates open, aggregate is evenly distributed for immediate fast mixing.

✓ Efficient "run-around" paddle arrangement in the twin-shaft pugmill speeds the mixing action.

✓ Faster and more thorough coating of aggregate is assured. The bitumen distributor pan, with twin rows of graduated discharge openings, sprays bitumen over the full length of the mixer.

✓ Unique plant breather system eliminates leakage of dust from batcher and mixer to prevent escape of valuable fines. Assures ideal working conditions for plant operator.



220 H.P.
the most powerful –
42,000 LBS.
the heaviest.

GALION T-700
MOTOR GRADER

the world's largest.

GRADE-O-MATIC features
assure you UNMATCHED
WORK CAPACITY.

- AUTOMATIC multiplication of torque (torque converter)
- AUTOMATIC application of power as needed (power-shift transmission)
- AUTOMATIC regulation of working speed (tail-shaft governor and decelerator)

This kind of power and control makes possible and practicable its 14' x 30" x 1" hydraulically shiftable moldboard – the most blade capacity ever built into a motor grader.

For new ease and accuracy in handling, you get Galion's combination manual with power booster steering. For ample traction and flotation, you have six 16.00 x 24, 12 ply, interchangeable tires.

The T-700 has the most improved steering mechanism, most efficient circle reverse, and most secure attachment of drive wheels to stub axles ever devised.

Its weight balanced to horsepower produces the tractive effort that gives you the most **PUSH POWER** at the blade, ever developed in a grader.

THE GALION IRON WORKS & MFG. CO.

General and Export Offices

Galion, Ohio, U.S.A.

Cable Address – GALIONIRON, Galion, Ohio

GALION
 ESTABLISHED 1907



MOTOR GRADERS & ROLLERS

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Ask the man who runs the rig...

***no one makes
a tougher tooth
than ESCO***



The right design, the right steel, the right shape make *ESCO* Points and Adapters right for every digging condition.

**The construction industry
looks to**



Electric Steel Foundry Co., PORTLAND, OREGON

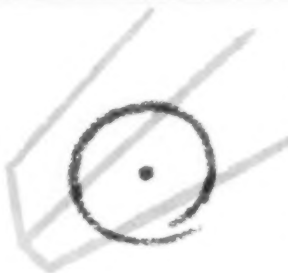
See reverse for shapes and size range >

Here are the points to remember...

**12M
ALLOY STEEL**

ESCO 12M Points are the toughest you can buy. Developed through years of research for the construction industry, cast *ESCO* 12M is carefully heat treated to produce the finest steel made for the severe shock and abrasion encountered by points and adapters.

**RIGID QUALITY
CONTROL TESTS
ASSURE
TOUGHNESS,
HARDNESS**



Every *ESCO* Point is Brinell tested to assure the exact degree of shock-absorbing toughness and abrasion-resisting hardness for longer digging life. Be sure to look for the Brinell mark on every *ESCO* Point you buy.

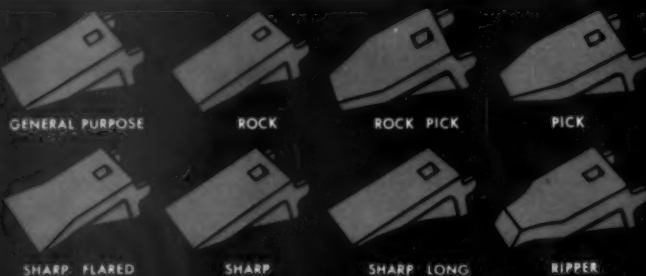
8 POINT SHAPES

You can select from eight different shapes to find the point that matches your digging conditions. *ESCO* Points are designed by bucket and excavation specialists who know how to achieve top digging performance. The self sharpening design of an *ESCO* Point makes it start sharp and stay sharp.

**ESCO Points and Adapters
for all digging equipment**

Your local *ESCO* dealer can supply Points and Adapters for all your digging needs. By using *ESCO* Points and Adapters on all your equipment you can cut costs further by reducing your point inventory and consolidating purchases. Call your *ESCO* dealer today for details. He's listed in the yellow pages of your telephone directory. Or, write direct.

LITHO IN U.S.A.



ESCO Point shapes start sharp, stay sharp and last longer under any digging condition.



ESCO

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.

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New Publications

Natural Rubber Leading Factor in Noise and Vibration Control

Recently successfully used natural rubber mountings have found use in offsetting problems of vibration, impact and noise. Because of its mechanical properties, the material is notably consistent in vibration-absorption and resistance to creep and permanent set.

By setting machines and structures on specially designed mountings incorporating forms of metal springing interwound with rubber, engineers are able to offset vibration at the source. Wear and tear on machines and buildings is materially lessened. Also, the decibel level is kept at a minimum.

The current issue of Rubber Developments describes two vibration absorbers that, between them, can handle problems ranging up to the heaviest engines. Available without charge from Natural Rubber Bureau, 1631 K Street, N.W., Washington 6, D.C.

New Manual Available on Base Stabilization

A new revised edition of Manual SM-1 "Calcium Chloride for Stabilization of Bases and Wearing Courses," is available on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D.C.

With data directed to assist highway engineers, contractors and material suppliers using calcium chloride in the construction of dense graded bases and wearing courses, this 34-page well-illustrated manual deals with properties and design, types and methods of construction and specifications.

Computer Literature Available

"Organizational problems encountered in setting up a computer" is the title of a bulletin being made available by Bendix Computer Division, Bendix Aviation Corporation, 5630 Arbor Vitae Street, Los Angeles 45, California. This paper was originally presented at the Fifth Illinois Structural Engineering Conference, University of Illinois, December 1958, by Elwyn H. King of Alfred Benesch &

Associates. It describes solutions to numerous problems that confront an engineering organization in the civil engineering field when contemplating the use of an electronic computer, and concludes with a brief explanation of the results his own firm experienced with their G-15 computer.

ENGINEERING MANUAL: A PRACTICAL REFERENCE OF DATA AND METHODS IN ARCHITECTURAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL, AND NUCLEAR ENGINEERING.

Prepared by a staff of specialists. Edited by John H. Perry and Robert H. Perry. 680 pages, 5 x 7 1/2, 267 illustrations. McGraw-Hill's Book Information Service, 327 West 41st Street, New York 36, N. Y. Price \$9.50.

This newly-published manual gives engineers a concise reference to the most commonly used data and methods in the various engineering fields. Every major phase of engineering is covered—from physical laws involved in the structural design of buildings, to illustrated instructions on highway and traffic engineering.

ARROW MOBILE HYDRAULIC HAMMER

AUTOMATIC • LOW COST CUTTING • BREAKING • TAMPING

The operator of the Arrow Mobile Hydraulic Hammer can set the hammer control upon **automatic** to deliver blows of uniform impact—or he can control the hammer manually. In addition, he can use the exclusive Arrow creeper-gear to move the machine at uniform speed up to 32 feet per minute. The machine can be driven over streets and highways under its own power up to 30 miles per hour.

ONE MAN CAN DO THE WORK OF SIX—All controls are hydraulic, and are conveniently located for operation from the comfortable, fatigue-reducing seat. A wide range of hammer points and tools, easily attached, makes the Arrow ready for a wide variety of jobs such as tamping backfill, cutting asphalt, breaking concrete, driving piles. One man and an Arrow can release for other work six or more men using conventional air-tools.

Hydraulically controlled striking power—The 1,000 pound hammer is hydraulically controlled to deliver any type of stroke up to a crashing blow of 8,000 ft. lbs. The tower tilts forward or backward, or from side to side.

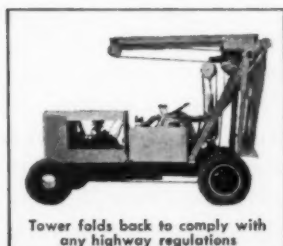
Service and maintenance easy—Arrow Mobile Hydraulic Hammers are engineered and built to give years of service under the constant pounding to which they are subjected. Parts for the chassis and motor are available at most MoPar Distributors.



For complete information, call your Arrow Distributor or WRITE FACTORY FOR DESCRIPTIVE LITERATURE.



ARROW MANUFACTURING CO.
194 West Dakota • Denver 9, Colorado



Tower folds back to comply with any highway regulations



"Our Ford F-800's, pulling 20-ton payloads, give us mighty good service!"

*says R. Dillard Teer, Vice President
Nello L. Teer Co., Durham, N. Carolina*

"We operate about 115 Ford Trucks ranging in size from ½-ton pickups to Tilt Cab Tandem tractors. We believe in carefully fitting the truck to the job to be done and usually stay within the manufacturer's recommended ratings. We make an exception to this rule with our Ford F-800's, pulling 20-ton loads in aluminum trailer dumps to our quarry and crushing setup at Durham, North Carolina. These units are carrying the maximum legal limit and give us mighty good service!

"We haven't traded any trucks in about 6 years. It just happens that our company has

been growing so rapidly that when we buy a new truck, usually an F-800, I put it under one of our trailer dumps. Then I'll take the old truck, lengthen the chassis, and make a grease outfit or a water wagon out of it. I would say out of over a hundred Ford units in the past 7 or 8 years, we have gotten rid of only a dozen altogether—and some of these were wrecked or burned.

"Another reason we use Fords is that this business is rough on trucks, so parts availability is very important. Our experience over the years with Ford as compared to Ford competitors has been definitely in favor of Ford on parts."



NOW! CERTIFIED PROOF!

FORD TRUCKS COST LESS

**'59 Ford Pickups
beat average mile-
age of other leading
makes by 25.2 % in
Economy Showdown U.S.A.**

Here at last is certified proof of the differences in gas mileage between six-cylinder pickups . . . evidence that you can use in your operation.

It was compiled by America's foremost independent automotive research firm after testing 1959 six-cylinder, ½-

ton pickups of the six leading makes. All trucks were bought from dealers—just as you would.

The tests paralleled every kind of driving—high speeds and low, open highways and city traffic, even door-to-door delivery. And in every test, '59 Ford Sixes delivered more miles per gallon than any other make. Here are the actual percentages:

'59 FORD PICKUP SIXES GAVE
42.6% better mileage than make "D"
31.1% better mileage than make "I"
25.2% better mileage than make "C"
22.0% better mileage than make "S"
9.6% better mileage than make "G"

Taken together, Ford got 25.2% more miles per gallon than the average of all other leading pickups!

What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces friction and requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

See your Ford Dealer for the full report of Economy Showdown U.S.A. and get the whole story firsthand.

All tests
conducted and results
CERTIFIED
by America's foremost
independent automotive
research organization*

*NAME AVAILABLE ON REQUEST

Send inquiry to P.O. Box 2687, Ford Division
Ford Motor Co., Detroit 31, Michigan

Now! During Dividend Days at your Ford Dealer's... Go FORD-ward for Savings

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New Publications

The Federal Role in Highway Safety

"The Federal Role in Highway Safety," a 232-page report submitted to the U.S. Congress by Secretary of Commerce Lewis L. Strauss on February 27, 1959, has been printed as House Document No. 93, 86th Congress, 1st Session. The study was undertaken and the report prepared by the Bureau of Public Roads as required by Section 117 of the Federal-Aid Highway Act of 1956.

The report summarizes findings

of the study and recommends actions that can be taken by the Federal Government to promote highway safety. Chapter I provides a general statement of the problem, which is placed in its setting in Chapter II. Chapter III reviews the highway transportation system—the driver, the vehicle, and the highway—as related to safety. Chapter IV evaluates current highway safety activities, and Chapter V discusses the nature of an adequate safety program. Five appendixes describe special studies made for this report.

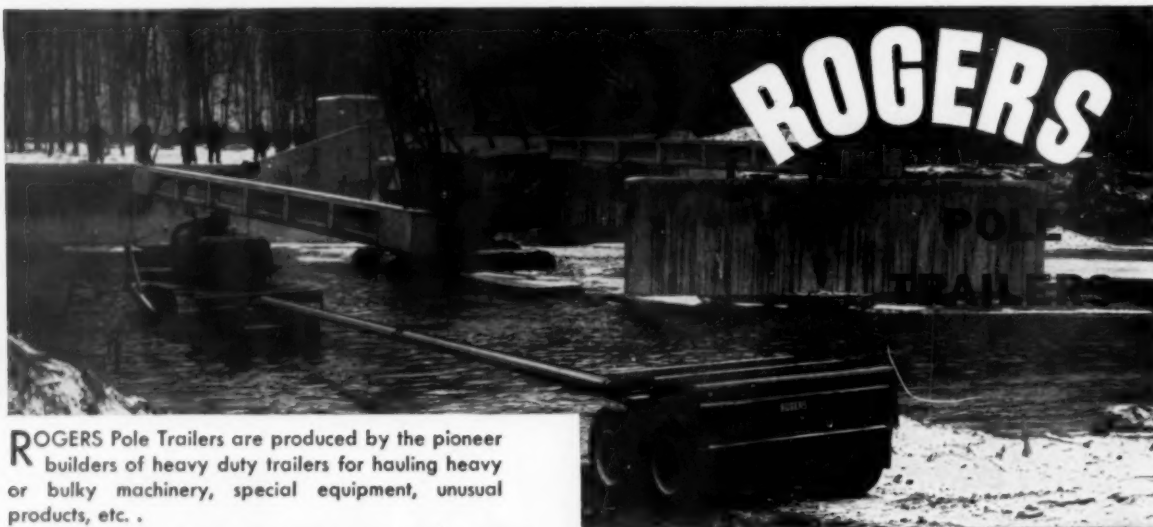
"The Federal Role in Highway Safety" is for sale by the Superintendent of Documents, Government Printing Office, Washington 25, D.C. for 60 cents per copy.

RAPID TESTS FOR AGGREGATE AND CONCRETE. Bulletin 201. Highway Research Board, 2101 Constitution, Washington, D.C. Price \$0.50.

This 23-page bulletin contains two papers on this subject as presented at the 37th Annual Meeting of the Board.

"Use of Swiss Hammer for Estimating Compressive Strength of Hardened Concrete," by William E. Grieb, describes a simple, quick, nondestructive test method for estimating compressive strength of hardened concrete in place.

"Rapid Freezing and Thawing Test for Aggregate," by R. H. Brink, describes a method using a water-alcohol solution as the freezing medium in place of the common sulfate soundness test.



ROGERS Pole Trailers are produced by the pioneer builders of heavy duty trailers for hauling heavy or bulky machinery, special equipment, unusual products, etc.

They feature facility of loading, ease of handling, safety of control and ruggedness.

In addition to rugged construction throughout including the use of large brakes and heavy duty roller bearings, versatility is a feature of these Roger Pole Trailers.

They have been in use for decades hauling long, unwieldy products including steel beams, iron bars, smoke stacks, special equipment, coast defense guns, etc.

With the development of prestressed concrete beams Rogers Pole Trailers were proven to meet the unusual requirements of this type of hauling.



The drawbars or reaches may be extended to haul long objects and then telescoped to permit fast return trips with a shortened overall length.

To the front section is welded a bar containing holes at intervals into which a pin in the locking cap is inserted.

This permits lengthening or shortening the drawbar in increments of two feet. Or, if found desirable, the reach can be removed entirely and rigid, self supporting objects lashed to the front bolster and its after end secured to the trailer bogie.

Note the various features then write for prices and any additional information desired.

If you have a new hauling requirement send the facts and we will submit recommendations without charge or obligation.

ROGERS HEAVY DUTY TRAILERS

ROGERS BROS. CORP. ALBION, PENNA.

Export Office: 50 CHURCH ST., NEW YORK 7, N. Y. U. S. A. Cable Address: Brosites

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Euclid **"TWINS"** give you a better return on investment



**Twin-Power all-wheel drive
scrapers get more work done
and move the cheapest dirt
on every kind of job.**



**Only the
EUCLID TS-24 SCRAPER
has all these features:**

2 engines—563 total h.p.

All-wheel drive

One-man operation

**32 yd. heaped capacity
(24 yds. struck)**

2 Torqmatic Drives

NoSpin differentials

**27.00 x 33 tires
(33.5 x 33 optional)**

The Euclid TS-24 Scraper can help you beat the squeeze on profits because it's the most versatile and most productive scraper in the field. Two engines, each driving an axle through separate torque converters and semi-automatic transmissions, provide maximum usable horsepower at all times. The "Twin" can self-load and move big loads out of soft or sandy borrow pits and over steep grades. With "no clutch" Torqmatic Drives, NoSpin differentials, and fast-acting, independent hydraulic controls, the TS-24 is easy to operate and has unequalled maneuverability.

Performance records from a wide range of work . . . from small jobs where one or two scrapers must handle all the earthmoving without supplementary equipment . . . to big yardage projects where the "Twin" is teamed with the Euclid TC-12 Crawler for high speed production . . . show that the TS-24 provides a big cost advantage.

The Euclid dealer in your area will be glad to give you details on the complete line and show you why *Euclids are your best investment.*

EUCLID Division of General Motors, Cleveland 17, Ohio



EUCLID EQUIPMENT

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Road construction

makes giant strides with

CLINTON WELDED WIRE FABRIC

In CF&I plants from coast to coast, this image stands for careful controls of *quality* in our steel products. One of the many steel products CF&I makes for the construction industry is Clinton Welded Wire Fabric. Highway departments rely on it to add both strength and long life to concrete roads and highways.

Use: CF&I-Clinton Welded Wire Fabric adds backbone to concrete . . . combines the strength of steel with the durability of concrete.

Result: The reinforced concrete greatly resists cracking and heaving due to temperature extremes and load stresses. And, because the fabric distributes shrinkage stresses evenly, the concrete is far less likely to crack during setting. If a small crack develops, the steel fingers of the fabric hold it together . . . prevent dirt or moisture from penetrating and expanding it.

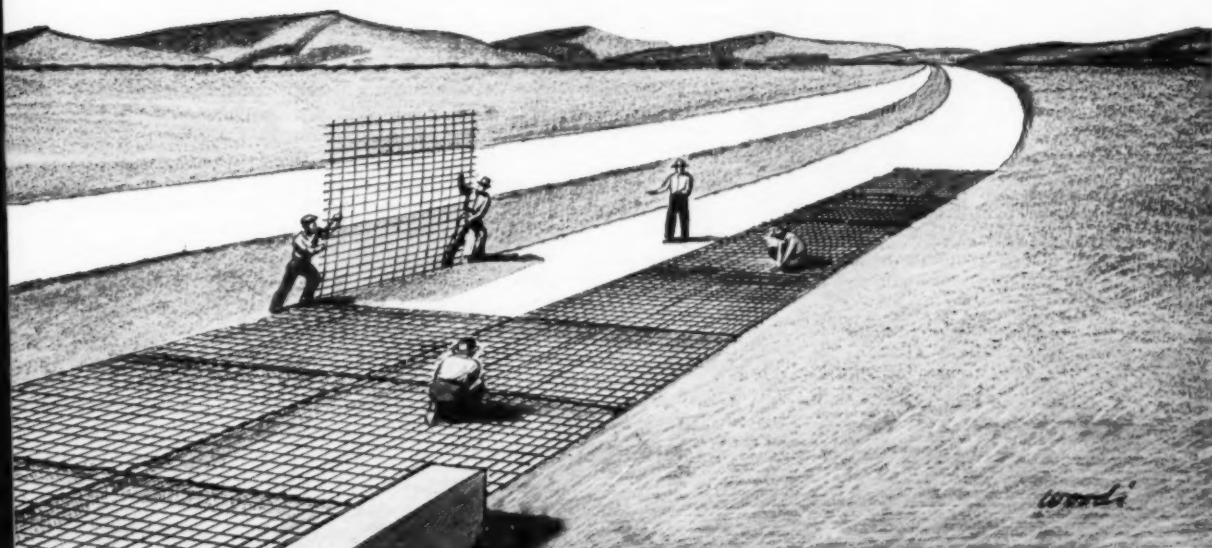
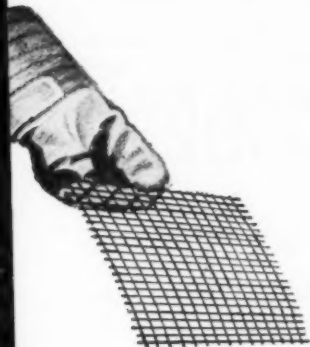
Contact our nearby sales office for complete price and delivery information on CF&I-Clinton Welded Wire Fabric.

CLINTON
WELDED WIRE FABRIC
THE COLORADO FUEL AND IRON CORPORATION



6615

In the West: THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise Butte • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita
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ROADS AND STREETS, June, 1959

ARBA Committee Maps Education Improvement

Plans to promote and foster the extension and improvement of instruction in highway engineering have been adopted as a major objective of the Educational Division of the American Road Builders' Association.

The division's executive committee, meeting in Washington, adopted a seven-point program of expanded effort, following a discussion of present weakness in highway engineering education curri-

cula. Members of the committee—leading educators in the field—said that rapid developments in highway engineering techniques have made many textbooks completely out of date.

Specific objectives adopted are:

1. To improve existing courses in highway engineering by directing attention to modern teaching aids demonstrating proper use of materials and equipment, proper design, and standard construction practices.

2. To assist colleges in initiating and developing curricula in mod-

ern highway engineering.

3. To develop effective procedures in highway engineering teaching.

4. To promote and support conferences and short courses for highway engineers and local highway officials and highway construction personnel.

5. To expand student membership in ARBA and to establish an active program in support of student chapters.

6. To cooperate with industry in organization of summer work programs for students and instructors of highway engineering.

7. To develop effective participation of engineering educators in technical committee activities of ARBA.

The committee also decided on a revamping of the division's committee structure, in order to provide a more effective framework for action.

Emmett H. Karrer, professor of highway engineering at Ohio State University, is president of the educational division and chairman of the executive committee. Other members of the committee are Maj. Gen. Louis W. Prentiss, USA (Ret.), executive vice president of ARBA; Ben H. Petty, professor of highway engineering, Purdue University; Calvin G. Reen, professor of civil engineering, Pennsylvania State University, and James W. Spencer, highway research and extension engineer, Cornell University.

"Small Airports" Booklet

The Federal Aviation Agency has released the newly revised publication "Small Airports." The booklet provides general guidance for those who want to establish a small community airport. Although designed primarily for planning the publicly owned airport, the information is equally applicable to the private airport for noncommercial local flying.

Price 20 cents, remitted to Superintendent of Documents, Government Printing Office, Washington 25, D.C.

• Secondary road projects in Virginia during 1959, will require 1,815,000 tons of aggregates according to J. V. Clarke, secondary roads engineer. About 80 percent will go for base, 15 percent for masonry and 5 percent for surface treatments.



**Over 2000
authorized
WISCONSIN
service
stations
are on call
if and when
you need
service!**

Let's face it — even Wisconsin heavy-duty air-cooled engines need service and parts occasionally! This honest approach has an equally realistic stop-gap — the ever-ready network of authorized Wisconsin service stations where parts and service are available on a moment's notice. As a result, you're never caught with your engines down for long because Wisconsin service is as near as your telephone.

You can rely on expert service by Wisconsin-trained personnel. Most of them are graduates of periodic service clinics and are thoroughly familiar with the design, construction, and operation of Wisconsin engines. Each service station — whether it's in Fairbanks, Topeka, or Mozambique — has a stock of Wisconsin parts to assure fast delivery — to put your equipment back in service with minimum delay.

Wisconsin heavy-duty air-cooled engines are known, used, and respected throughout the world. So are the more than 2000 authorized Wisconsin service stations and their work. You can rely on both to keep your work loads "on-schedule" anywhere, at any time! Write for Form S-198 which lists all the authorized Wisconsin service stations throughout the world.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN

World's Largest Builders of Heavy-Duty Air-Cooled Engines

A9-4229



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New life... new job. As part of its rehabilitation program, Liberty works to retrain severely injured employees of policyholders. Men are interviewed and given IQ tests. Some are even sent to school to acquire new skills. Goal: to place rehabilitated persons in jobs that best suit them.



New look at injuries—new savings. Liberty retains some 75 leading orthopedic surgeons to check on complicated injuries to policyholders' employees. These specialists give expert assistance in diagnosis and treatment, help patients recover more quickly.

How safety engineering pays off. By checking for hazards on every phase of your job, Liberty's construction safety engineers can help you cut compensation costs. Hundreds of our construction policyholders have saved money this way.

New ways Liberty Mutual provides

Protection in depth

to safeguard your people...to cut workmen's
compensation insurance costs

If you have a series of bad accidents on your jobs, your compensation insurance costs can go up substantially. At Liberty Mutual, we can help you prevent loss and cut compensation costs by making available a wide range of extra skills and resources.

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Protection in depth has enabled Liberty Mutual to return dividends every year since 1912. Total dividends to date: more than \$491 million. You can buy protection in depth only from a Liberty salesman. Contact our nearest branch office now for further details.



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Types of insurance: Automobile, Homeowners', Liability, Group Accident and Health, Fire, Workmen's Compensation, Marine, Crime

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Here's a *Safe* and *Simple* way
to load . . . unload
and transport



Construction equipment gets bigger, harder to load and certainly more costly. So what better reasons are there to choose the fast, safe and simple front-end loading and unloading provided by LACROSSE Removable Gooseneck Trailers.

First, consider LACROSSE Removable Gooseneck design: both ends of the gooseneck have standard kingpin and fifth wheel hook-up . . . fool-proof, positive locking so familiar to everyone. This design—without the use of winch, power or hydraulic attachments—permits loading and unloading to be

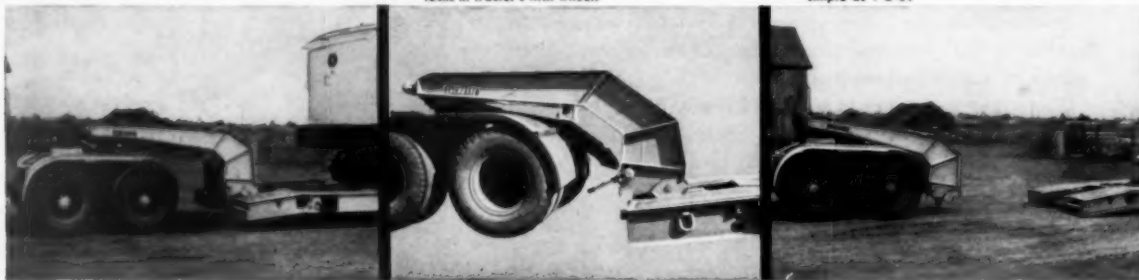
accomplished in the three safe and simple steps illustrated below.

Important, too, running gear and brakes on these Removable Gooseneck Trailers are LACROSSE designed, engineered and manufactured . . . your assurance of generous overload strength and support. Units available with capacities of from 25 to 75 tons payload. Options of flat deck, drop side deck or beam deck design. Two and three axle models. Get the full facts from your LACROSSE Dealer or write for the brand new brochure No. RG-2560.

① Release tractor kingpin connection and pull away; trailer gently lowers to the ground.

② Swing hinged stirrups on gooseneck to up position and back up tractor till upper kingpin locks in tractor's fifth wheel.

③ Release lower kingpin from trailer fifth wheel and tractor pulls away with gooseneck. As simple as 1-2-3!



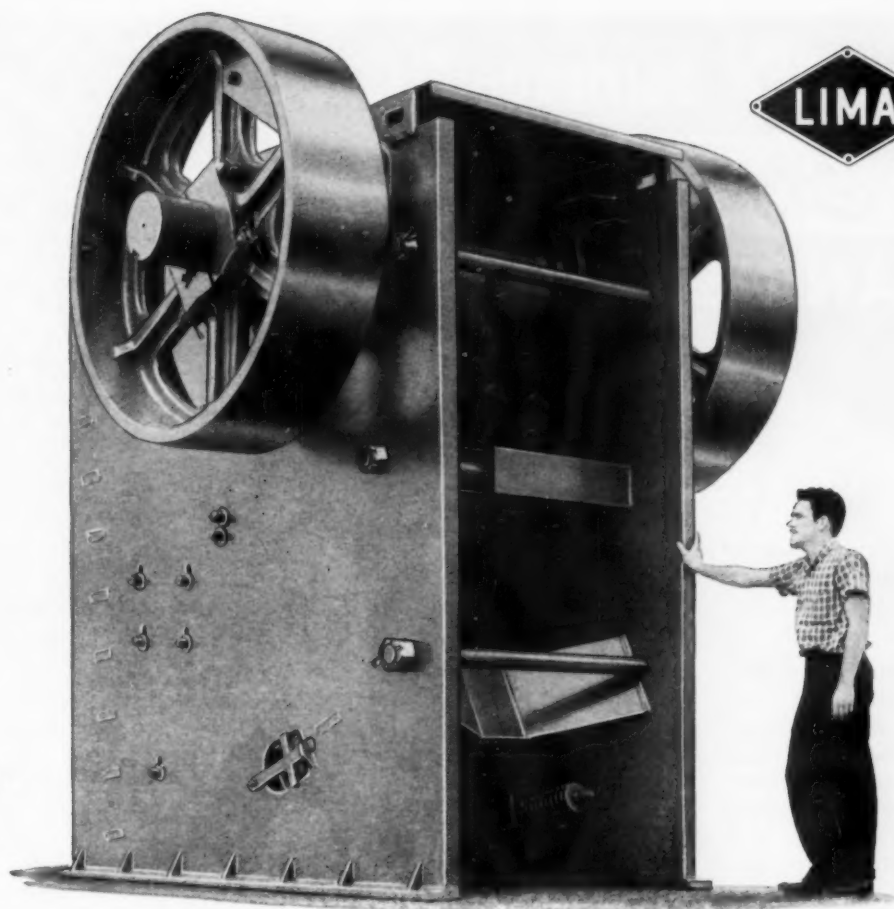
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418 Gould Street • La Crosse, Wisconsin

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Lima
Austin-Western
Model 4248
overhead
eccentric
roller bearing
Jaw Crusher



LIMA A-W 42x48-in. Jaw Crusher produces more rock for less

Speed up crusher output with giant Lima Austin-Western 42 by 48-in. overhead eccentric roller bearing Jaw Crusher. Quality built to outperform! Oversized shafts and roller bearings for extra strength and durability. Extra-deep jaws of tough manganese steel form smaller, sharper and more efficient crushing angle.

main frame is practically unbreakable. Low alloy, high strength 3-in. steel plate gives frame tremendous strength in proportion to its weight.

flywheels are heavy castings, precision machined to proper balance. Split-type hubs simplify flywheel removal. Flywheels are key-locked into place, can't back off in operation.

pitman and shaft assembly can be easily removed through crusher frame top. Cartridge-type housing holds assembly in place, eliminates possibility of loose bearings.

bearings—Both main and pitman bearings are oversized and self-aligning to permit some shaft deflection, and deviation is minimized by locating the bearings close together. Frame absorbs part of shock load as main bearing center lines are within sides of main frame.

Bearings are protected by a simple-type steel labyrinth seal which resists entrance of dirt and seals in lubricant. Bearings may be easily removed by use of a hydraulic system furnished with this model.

capacity—What the Model 4248 can do for you may be seen from the fact that it handles 240-360 tons an hour when set at 5-in. discharge opening; estimate based on 2700 lb. per cu. yd.

Lima Austin-Western also produces a complete line of crushing and screening equipment and portable and stationary plants. Other smaller sizes of roller bearing Jaw Crushers are also available.

Profit from our 73 years' experience manufacturing Jaw Crushers and equipment for pit and quarry. Engineered and built to produce more rock at less cost! See your Lima Austin-Western distributor now or write us for free bulletin.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO



ROADS AND STREETS, June, 1959

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BRAND NEW Barricade Flash!

the *Big Beam*

TRANSISTA FLASH

- Transistor type, heavy duty for long, dependable life.
- No moving parts to get out of order.
- Two-directional head or 360° dome type Fresnel.
- Electronic flashing mechanism weatherproofed. Telescoping top and rubber gasket make battery case completely weatherproof.
- Acid-proof plastic liners prevent interior case corrosion.

TRANSISTA FLASH produces approximately 2000 hours of continuous flashing from two standard 6-volt batteries, available anywhere. Provided with a concealed, tamper-proof switch operated from outside of case. Equipped with bracket for attaching to barricade. Lens or Fresnel supplied in either amber or red plastic—specify color. Flash frequency is approximately 72 times per minute. Lamp is finished in yellow baked enamel.



No. 433 Barricade—All metal, strong, stable on any surface. Has angle iron construction, closed ends.



Model 410T



Model 418T—with dome type Fresnel.



Model 417T—7 inch head. Otherwise, same as Model 410T.

Big Beam—makers of explosion-proof lamps, emergency lights, hand lamps and flares.

U-C-LITE MFG. CO. 1023 West Hubbard Street
Chicago 22, Illinois

Export Department: 201 N. Wells St., Chicago 6, Ill. Cable Address: ENOTS
In Canada: Bernard Marks & Co. Ltd., 70 Claremont St., Toronto 3, Ontario

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"Buy American" Policy For Federal-Aid Highways

State highway departments may restrict the use of foreign materials in Federal-aid highway work, provided the restrictions do not exceed those now applied to Federal construction, the Bureau of Public Roads, U.S. Department of Commerce, has announced.

Federal Highway Administrator B. D. Tallamy, in a circular memorandum to BPR field offices and state departments, set forth six conditions under which the use of materials of foreign origin could be restricted within the framework of the so-called Buy American Act.

The Buy American Act, enacted in 1933, gives preference to domestic materials, subject to considerations of reasonableness of price and the public interest. An Executive Order (December, 1954), provides a yardstick for determining the reasonableness of the price of domestic in relation to foreign materials. In general, it permits the use of materials of foreign origin if a saving of at least 6 percent can be thus realized.

Tallamy's memorandum prescribes a workable procedure for overcoming some of the administrative difficulties involved in the application of the Buy American requirements to construction contracts. The memorandum stipulates these restrictions:

1. Bidders must be clearly informed of the restrictions and the particular materials or articles subject to the restrictions;
2. The restrictions may be imposed only upon a material or article that is set forth in the bid form as a bid item;
3. The bidder must indicate in his bid whether he proposes to furnish a foreign article or material;
4. The bid price for any such bid item of any bidder offering a material or article of foreign origin shall be required to include applicable duty and all costs incurred after importation, including costs of delivery to the place specified, but not including incorporation in the project;
5. For the purpose of comparing bids, the total bid price on the entire contract submitted by any bidder offering a material or article of foreign origin, shall be increased

(Continued on page 53)



JOB RECORDS PROVE

Firestones lower tire costs-per-hour!

Firestone off-the-highway tires cut costs by working extra hours on the roughest jobs! That's because they're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. Tough Firestone treads and sidewalls defy cuts from rubble and shale. Exclusive Firestone S/F (Shock-Fortified) nylon bodies shrug off bruising shock and impact. There's a Firestone tread and tire design that is job-engineered for your job requirements. Call your Firestone Dealer or Store and ask about Firestone's full line of tubeless or tubed off-the-highway tires and on-the-job tire service.



Rock Grip Excavator
Wide Base

Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

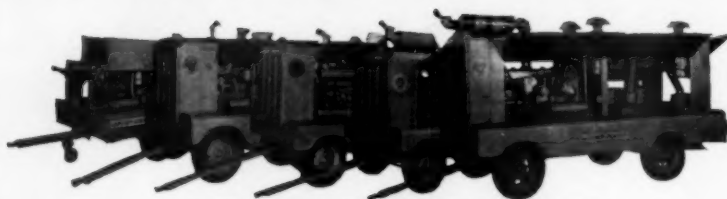
Firestone
BETTER RUBBER FROM START TO FINISH

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ONLY GARDNER-DENVER ROTARIES

Give you all these
field-proved
portable compressor
advantages



Left to right, Models RP125, RP210, RP365, RP600, RP900.

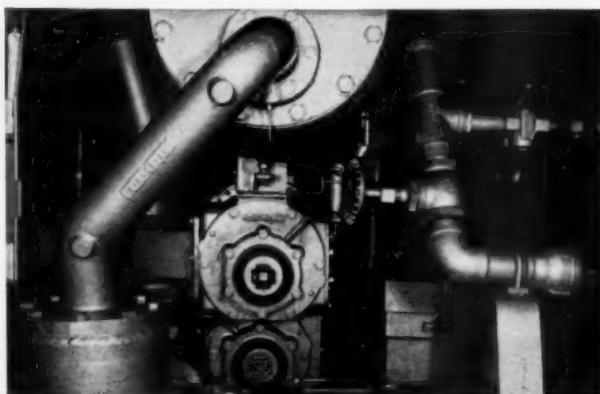
Safe, sure all-weather operation—water-oil cooling system keeps engine and compressor temperature constant.

Lubricated cold-weather starting—clutch allows compressor oil to be warmed before engaging compressor.

Positive flood lubrication—instantaneous oil flow not dependent on receiver pressure.

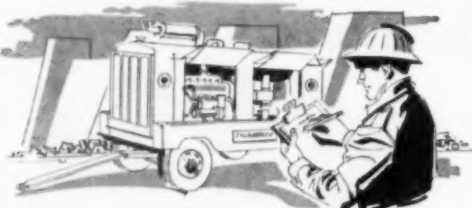
Fuel economy plus—exclusive Gardner-Denver "THRIFTMETER"® saves fuel, saves wear and tear on engine and compressor.

Simplified field maintenance—all compressor parts are easy to get to, making inspection and field maintenance faster and easier. See your Gardner-Denver distributor or write for bulletin.



The Gardner-Denver rotary requires no major dismantling job for inspection of working parts. Only a few minutes are required to remove the 12 cap screws to expose all the blades for routine inspection or replacement that assures trouble-free operation.

KEEPING TAB ON PROGRESS



At Gardner-Denver there's no substitute for men—our philosophy of growth for 100 years. Gardner-Denver engineers know your field from field experience . . . keep in constant touch with men and machinery . . . seek new ways of developing surer, safer, more productive equipment.



EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ont.



Gardner-Denver RP900's on Glen Canyon diversion tunnel job provide trouble-free air for all phases of this major project.

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(Continued from page 50)

by an amount equal to 6 percent of the bid price for such material or article;

6. The contract amount shall be based upon the bid as submitted, without regard to such differential.

"Restrictions presently imposed by state highway departments shall be carefully reviewed and, if necessary, revised to conform with the requirements hereof to avoid jeopardizing Federal participation in the projects involved," Tallamy said. "Public Roads will not approve any plans, specifications or other contract documents or any contract award which is inconsistent with this memorandum."

The memorandum does not apply to state highway departments that do not impose or contemplate imposing restrictions on foreign materials in Federal-aid work.

Land Suits Hit Arkansas Highway Plans

The state highway department of Arkansas must go to court for every one of four pieces of land it needs for highway right-of-way, said a news item in the *Memphis Commercial Appeal*.

The situation is considered news across the Mississippi over in Tennessee where right-of-way procedures have recently slowed the road program.

The dispatch quotes Fay M. Wallace, head of the Right-of-Way Division in Arkansas, as saying that of course all appraisals are made on current market value basis. The state takes cases to court where the demands of the property owner are considered unrealistic.

Mr. Wallace says that a new highway usually increases the value of adjoining land, regardless of what the owners argue. A traffic interchange on a major highway, for example, can boost land from \$500 up to \$10,000 per acre in extreme cases.

Contrary to popular opinion, Mr. Wallace said, land speculators are not a source of trouble, mainly because land owners generally are well informed and they know they can get as much for their land as a speculator can obtain later.

C. W. BEAVER, plans and program engineer, Wyoming highway department, has received a pin and certificate for 30 years of service with the department.

here's the all-new **Hopto**® line

MODEL 500

carrier or crawler mounted

This all new Model 500 HOPTO Hydraulic Excavator packs heavy-duty capacity with up to ¾ yard buckets. Full 360° swing and digging depth of 20 feet. Operation is fully hydraulic—there are no cables, drums, sheaves, chains or belts. Quick-change attachments include backhoe, shovel, clamshell and ditch cleaning bucket.



MODEL 200-TM

truck mounted

This ¾ yard Model 200 Hopto rolls from job to job at highway speeds, digs 13' 6" deep, and outworks many ½ yard excavators. Operation and control are fully hydraulic with the Hopto triple hydraulic system for full power on simultaneous multiple actions. Backhoe and shovel buckets are interchangeable.



MODEL 200-SPC

self-propelled crawler

Tough working conditions are made-to-order for this crawler mounted Model 200 SPC. Offers the same triple hydraulic system as the Duplex truck mounted model. Seat swivels to face either set of controls for fast operation. It digs 14' deep, has a 19' reach, 11' loading height.



MODEL 200-SPR

self-propelled carrier

Fast job-to-job mobility, easy one man operation, and a 16 foot turning radius are built-in advantages of the Model 200 SPR. Triple hydraulic system and dual controls mean fast cycling and high production. Backhoe or shovel buckets are interchangeable in minutes.

COMMON FEATURES: Heavy-duty hollow box boom of heavy formed steel plate. Positive, uninterrupted swing. 180° bucket wrist action opens full for straight and square sidewall excavation; closes full to insure heap loads. Fatigue-free, split valve controls give smooth, positive control of triple tandem pump and three individual hydraulic circuits. Full power and speed on all actions, simultaneously!

Distributors in over 75 principal cities in the United States and Canada

Hopto®

a product of

WARNER & SWASEY
BADGER DIVISION
WINONA, MINNESOTA

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WARNER & SWASEY, MANUFACTURERS OF

Gradall, Hopto EXCAVATORS AND Duplex TRUCKS

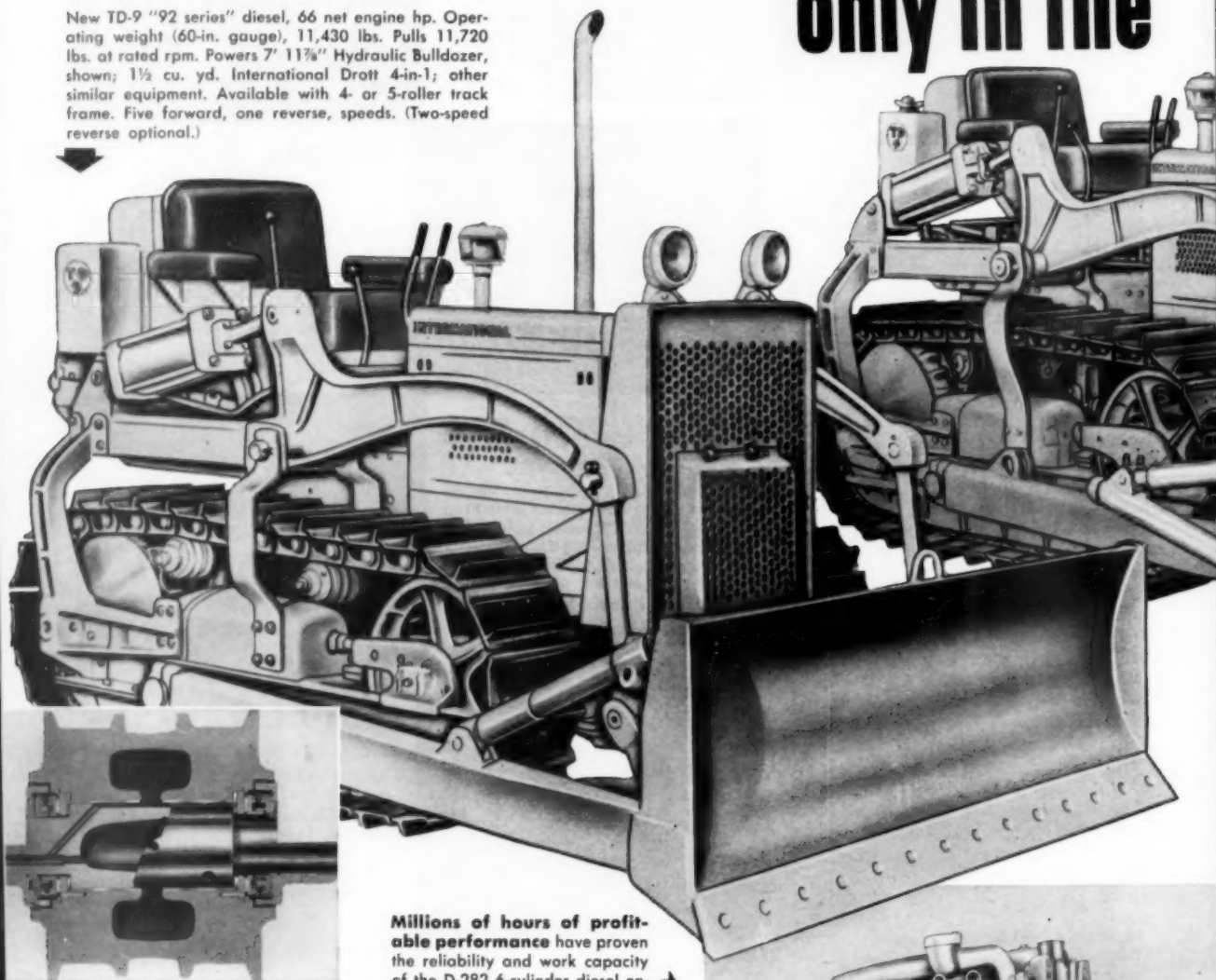
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NOW... SIX-

only in the

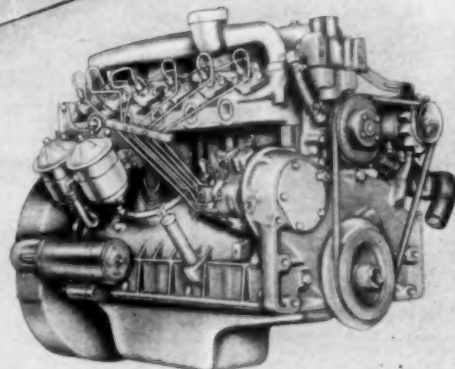
New TD-6 "62 series" diesel, 52 net engine hp. Operating weight (50-in. gauge), 8,665 lbs. Pulls 8,715 lbs. at rated rpm. Powers 8' 10½" Hydraulic Bulldozer shown; 1½ cu. yd. International Drott 4-in-1; other similar equipment. Available with 4- or 5-roller track frames. Five forward, one reverse, speeds. (Two-speed reverse, optional.)

New TD-9 "92 series" diesel, 66 net engine hp. Operating weight (60-in. gauge), 11,430 lbs. Pulls 11,720 lbs. at rated rpm. Powers 7' 11½" Hydraulic Bulldozer, shown; 1½ cu. yd. International Drott 4-in-1; other similar equipment. Available with 4- or 5-roller track frame. Five forward, one reverse, speeds. (Two-speed reverse optional.)



New 500-hr. lube interval TD-6 and TD-9 track rollers are of heavy-duty International design. Heavy-duty roller bushings are supplied from big 300% increased lube reservoirs. Exclusive vented shafts in top and front idlers, and in track rollers protect the seals from over-lubrication.

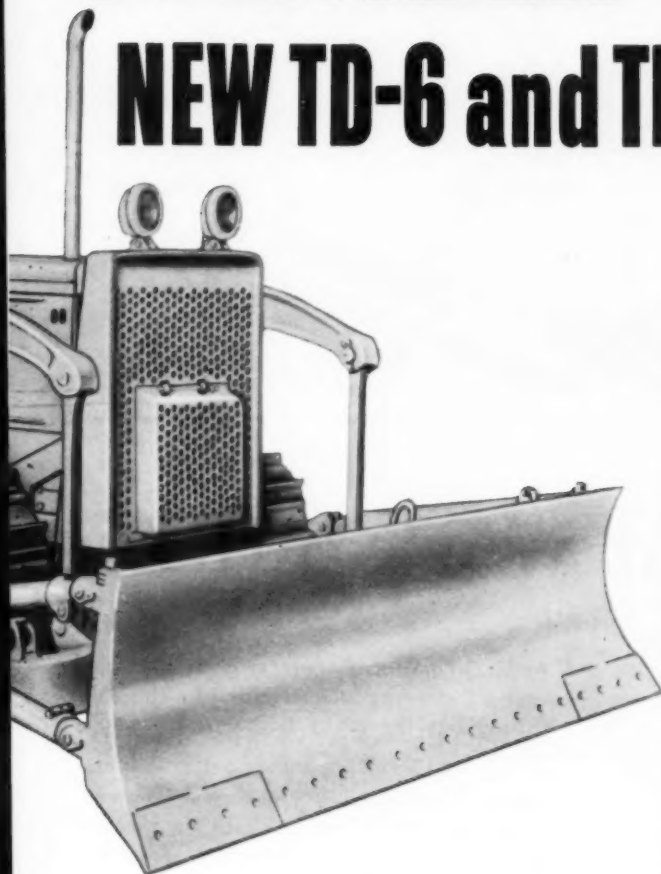
Millions of hours of profitable performance have proven the reliability and work capacity of the D-282 6-cylinder diesel engine. It's naturally-aspirated in the TD-6; turbocharged in the TD-9. Direct-electric started, this fast-governed performer features the most simple, efficient, and compact rotary-type fuel-injection pump built! Other D-282 long-life, low-upkeep features include: trimetal main and connecting rod bearings; file-hard, replaceable cylinder sleeves; and extra power from every ounce of fuel energy put to work with a new super-swirl piston face.



- CYLINDER

- smoothness
- capacity
- operating dividends

NEW TD-6 and TD-9!



Smooth, high-torque 6-cylinder diesel power make the new TD-6 or TD-9 ideal clean-up dozer units on any sized contract; or main-producing units with dozer or excavator-loader on many sizes of jobs!

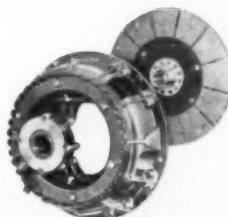
Now you get the smoothness, the high-production power wallop, the dependability of a fully-proven, fuel-thrifty 6-cylinder International diesel engine—only in the new TD-6 and TD-9 crawlers. This high-torque diesel has direct-electric starting; simple, compact, rotary-type precision fuel injection!

New TD-6 and TD-9 crawlers have exclusive vented shafts in track rollers, and top and front idlers, to assure positive seal protection from over-lubrication. And newly-designed track roller shells have a big, 300% increased lube capacity, to make 500-hour lube intervals a practical reality!

Both of these versatile new models have the power-transfer efficiency, and all-temperature workability of new dry-type, full-face sintered metal engine clutches. Choose from a proven line of dozers, loaders, and other equipment to take full advantage of TD-6 or TD-9 six-cylinder power!

From direct-start button to heavy-duty radiator guard, new TD-6 and TD-9 crawlers practically put their new production boosting advantages under "touch control." Let a "no-holds barred" competitive demonstration prove how easily you get their big bonus margin of earning capacity. See your International Construction Equipment Distributor!

Here's the sintered metal engine clutch driven member—for TD-6 and TD-9 crawlers. New full-face design provides smooth mating of surfaces, gives the holding power and heat defiance for full-torque performance. And you get all the other advantages of dry-type clutch simplicity and low upkeep!



**International[®]
Construction
Equipment**

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

... for more details circle 332 on enclosed return postal card





Design of the Huber-Warco 8-12 ton tandem permits the unit to compact base gravel close to steel forms.

H-W Units at work on Erie

Handling the compaction work for Johnson, Drake & Piper on project FAET-564 on the new Erie Thruway were three Huber-Warco rollers—two 10 ton 3-wheels and an 8-12 ton tandem.

Known as the West Seneca project, it involved 4.19 miles of pavement including interchanges, and seven bridges.

On this job the Huber-Warco rollers compacted one and a half million yards of dirt, about 10,000 yards of bank-run stone, and 32,000 yards of foundation course gravel for the road bed.

For rolling inside the steel forms, Johnson, Drake & Piper used their Huber-Warco tandem. The roller followed directly behind the form grader. The design of this Huber-Warco tandem enabled the operator to compact the material right up to the

forms. The extra operator visibility and ease of steering helped simplify the job throughout the many hours of precision work.

Huber-Warco tandem and 3-wheel rollers offer many distinct advantages that add up to more efficient and economical rolling. They each offer a torque converter and two-speed transmission. In addition, these units feature a tail-shaft governor. Within close limits, this tail-shaft governor maintains the rolling speed set by the operator, regardless of the grade.

Another important feature is a completely adjustable guide roll assembly that eliminates road "scuff" caused by looseness. Easy adjustment makes it possible to keep the guide roll assembly in factory-perfect

Huber-Warco Company

MARION, OHIO

Huber-Warco on the job

.....

Huber-Warco tandems and 3-wheels
handle compaction assignments
for Johnson, Drake & Piper
on New York's Erie Thruway project.



Thruway

alignment for the life of the roller.

In the Huber-Warco 3-wheel roller line both standard and variable weight rolls are available in a range of from 10 to 14 tons. The tandem line consists of seven models ranging from 3-5 to 10-14 ton.

Your Huber-Warco distributor can give you specifications on the Huber-Warco tandem and 3-wheel roller line. Contact him soon and be ready for smoother, more profitable rolling operations.

... for more details circle 328 on enclosed return postal card

ms up to 36 months and
tals available . . . contact
r Huber-Warco distributor.



Torque converter and 2-speed transmission add to efficient compaction by this Huber-Warco 10-ton 3-wheel roller.



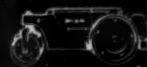
TANDEM ROLLERS



MOTOR GRADERS



MAINTAINER



3 WHEEL ROLLERS



● Russell Gehling, service manager, Ehrbar Equipment Co., Union, N.J., receives coveted Master Technician pin from E. G. Frasse, International Harvester service representative, at Harvester's Melrose Park, Ill., works.

"Harvester Tech" Melrose Institute Graduates

Melrose Technical Institute—service training center of International Harvester Company's Construction Equipment Division—has awarded seven Master Technician certificates to distributor personnel. These honors—the highest that can be garnered by the professional service technician in the construc-

tion equipment field—are the first given by International Harvester to distributor or contractor men since the present rating system was inaugurated in 1957.

International Harvester previously had conferred Master Technician ratings on 54 members of its own service organization who had completed a rigorous training course.

Under the Melrose Tech rating system, the men first were classified as Service Technicians No. 2, then Service Technicians No. 1 before attaining the coveted Master's award.

As Service Technicians No. 2, the men were required to have two years' continuous experience on International construction equipment, a working knowledge of special service tools and shop equipment, completion of at least 15 Melrose Tech courses, and satisfactory completion of examinations at end of each of the 15 courses.

As Service Technicians No. 1, the men were required to have four years' continuous experience on International construction equipment (including one year of field experience, or the equivalent), completion of at least 30 Melrose Tech courses, the presentation of a minimum of five courses, and the satisfactory completion of examinations at the end of the 30 courses.

To rate as Master Technicians, the seven men had to run the following gamut: Eight years, con-

(Continued on page 62)



IGLOO...

ugged as the men who use them

IGLOO leads in water cooler sales because it's stronger, lasts longer. IGLOO will keep more men on the job more of the time. When you order water coolers, specify IGLOO. Available in 2, 3, 5, 10 and 15 gallon sizes.



IGLOO CORPORATION

BOX 8227

MEMPHIS 4, TENN.

first in sales/buy the best cooler--buy IGLOO

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Keep your equipment working
with CF&I Cutting Edges

The CF&I Image reflects the dependability of *all* CF&I steel products used in the construction industry. On your earthmoving jobs you'll get this dependability when you use CF&I Cutting Edges.

You cut equipment downtime when you use CF&I Cutting Edges, because they are made to stand up under the most rugged conditions. These cutting edges are hot-rolled from special analysis steel selected for toughness and abrasion resistance—steel which has been quality controlled

through every manufacturing stage and fabricated to fit your equipment.

More than 700 CF&I distributors—located coast to coast—stand ready to supply your blades without delay. Grader blades and cutting edges are available in a wide range of curved or flat surfaces, widths and thicknesses for fast, on-the-job installation.

For specific information contact your nearest CF&I sales office or distributor.



CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

In the West: THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

In the East: WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

6621

... for more details circle 300 on enclosed return postal card

They said it couldn't be done!

FIVE YEARS AGO Euclid started an intensified program of product improvement and development that was far beyond anything that had ever been done in the construction equipment industry. Always a leader in years-ahead engineering that made "Eucs" outstanding performers on the toughest jobs, Euclid anticipated your need for still larger, more efficient equipment to help beat the squeeze on profits.

Without tricky project names or slogans, the development program moved full speed ahead. New machines were put through exhaustive tests at Milford Proving Grounds and the General Motors Tech Center with its unsurpassed testing and research facilities. Then followed actual job operations on a wide range of work... under close check by Euclid product engineers so that further improvements in productive capacity and service life could be made. One by one, new machines were added to the Euclid line as their efficiency, design and reliability were established.

5 YEAR DEVELOPMENT

... most extensive ever undertaken

1956

Now Euclid offers the most complete line of modern, large capacity job-proved earthmovers in the industry. Here's what has been accomplished in the past five years to provide equipment that enables you to bid more profitably:

5 new scraper models with capacities from 7 to 24 yds. struck... other models increased in power and capacity

4 new rear-dump haulers—12 to 35 ton capacities—with major improvements in performance of other models

2 new crawlers with a completely new design concept that provides unmatched work-ability... TC-12 with Twin-Power is the world's most powerful crawler

1958

No matter how small or how big the job, there's a Euclid model that will move yardage more profitably. Before you replace or add to your equipment fleet, get all the facts from your Euclid dealer. He can show you how Euclid's development program can mean lower earthmoving costs and a better return on your investment. EUCLID Division of General Motors, Cleveland 17, Ohio



EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE



◀ S-7 9 yds. heaped



S-12 17 yds. heaped



TC-12
402 net h.p.



S-18
30 yds. heaped



TS-24
32 yds. heaped



C-6
202 net h.p.



R-27 27 tons



SS-24 32 yds. heaped



◀ S-12 RD
22 tons

2 other models of 12
and 35 ton capacities

PROGRAM...

EUCLID

11 completely new JOB-PROVED earthmovers

... for more details circle 324 on enclosed return postal card

(Continued from page 58)

tinuous experience on International construction equipment (including three years' field experience, or the equivalent), responsibility of shop administration for at least two years, completion of at least 50 courses (and attendance at one or more Melrose Tech courses since receiving Technician No. 1 rating), the presentation of a minimum of 25 courses, and the satisfactory completion of examinations at the end of 50 courses.

Federal-Aid Road Work Tops \$7 Billion

Federal-aid highway work under way on March 31 set a new record high of \$7,185,000,000, an increase of \$2 billion over the same date a year ago, according to the Bureau of Public Roads. Of this amount, \$5,248,000,000 represents the U.S. share of the projects undertaken by the states.

By July 31, when the construction season is in full swing, it is

Status of the Federal Highway Program				
As of March 31, 1958	Total Cost	Federal Funds	Project Miles	bridges No. of
Interstate	\$2,875,148,241	\$2,266,396,508	2,954.9	2,785
ABC Roads	2,311,125,222	1,189,690,013	22,451.5	5,176
Total	\$5,186,273,463	\$3,456,086,521	25,406.4	7,961
As of March 31, 1959				
Interstate	\$4,229,563,566	\$3,660,469,174	4,421.4	4,467
ABC Roads	2,955,144,965	1,587,984,991	27,696.9	5,756
Total	\$7,184,708,531	\$5,248,454,165	32,118.3	10,223
(ABC Roads are Federal-aid primary, secondary and urban roads.)				
A project-mile (see table) may include work comprising only part of the total improvement. For example, grading contracts, which will subsequently be followed by paving contracts.				

estimated by BPR that Federal-aid work under way will rise to about \$8,100,000,000, including \$6 billion of Federal funds.

Texas Department Installs 158 Radio Units

Two-way radio equipment to be used by the Texas highway department in the Paris, Odessa, San Antonio, Pharr and Atlanta districts, was recently in production by the contracting company, Motorola of Chicago.

Twenty-five base stations and 158

mobile units are being supplied for these portions of the statewide system under a \$155,000 contract. The completed network will enable communications between vehicles, district offices and warehouses.

AIR-VOIDS IN CONCRETE AND CHARACTERISTICS OF AGGREGATES. Bulletin 196, Highway Research Board, 2101 Constitution, Washington, D. C. Price \$1.00.

Contains three papers presented at the annual meeting of the Highway Research Board.

GARRISON POWER STEERING

now standard equipment
on all



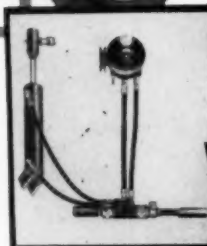
Transit Mixers and Crane Chassis



Pays for itself fast! Operators buying CCC Trucks will be happy to know that Garrison Power Steering is now standard equipment on many models and optional on all others.

With Garrison Power Steering, hydraulic power does 80% of the work of wheel turning. Maneuvering in tight quarters, or in sand, rubble, etc., is accomplished quickly with only slight pressure on the wheel. Greater steering control enables the operator to deliver the load faster—do more in a day's time. Equipment takes less of a beating, because road shocks are absorbed by the power cylinder, reducing wear on the steering mechanism.

Be sure you get the advantages of Garrison Power Steering on your next CCC Transit mixer or truck crane chassis.

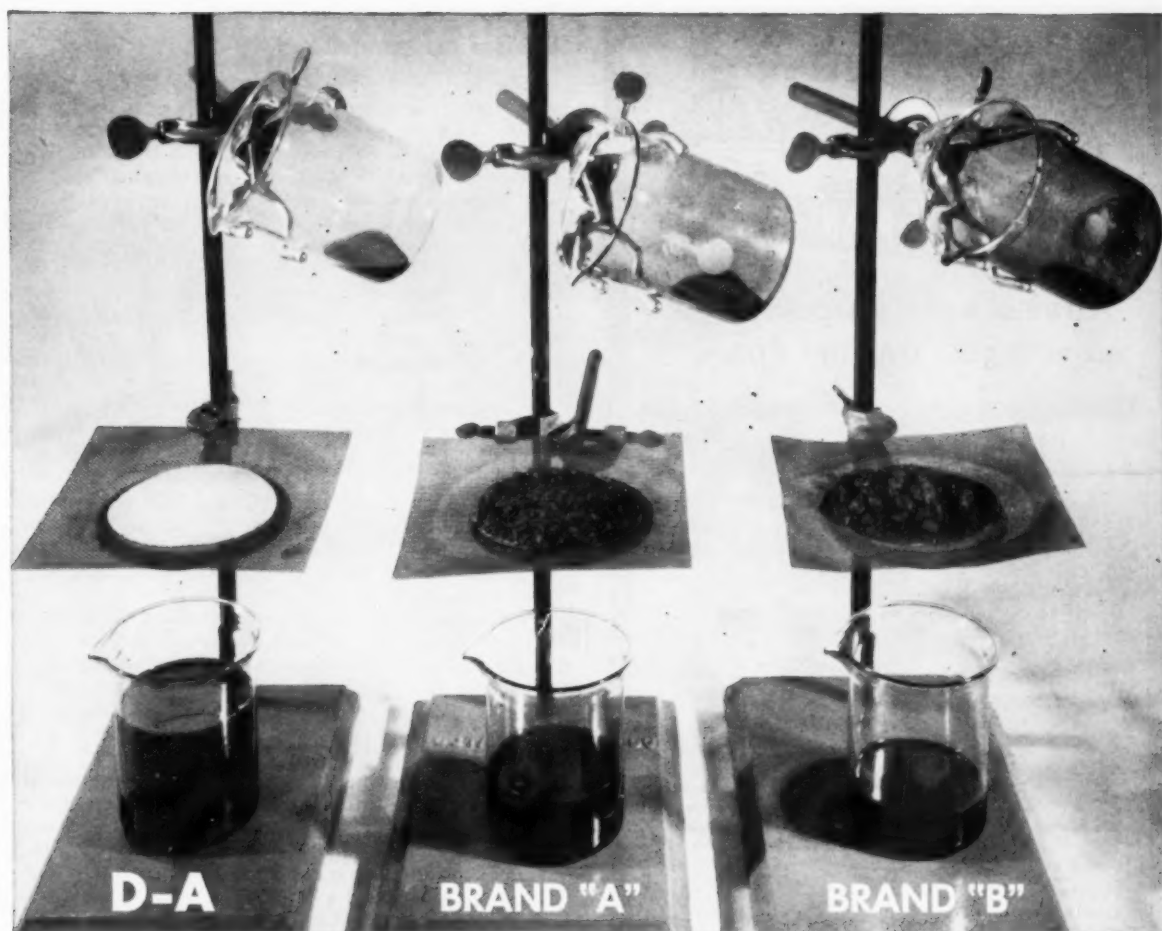


Kits Available for Field Installation
—Garrison Power Steering is now available as standard or optional equipment for almost all makes of trucks, tractors, and off-the-road equipment; or in kit form for field installation. Get in touch with your Garrison distributor today.

GARRISON
Manufacturing Co.

4609 East Sheila Street • Los Angeles 22, California

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Stop sludge, stop corrosion with D-A UNIVERSAL GEAR LUBE

The unretouched photograph above shows the results of a 24-hour accelerated oxidation or sludge test. On the right, two leading brands of gear lube are badly oxidized following the test while, on the left, D-A Universal Gear Lube remains clear, stable and capable of extended use.

Here's what this means to your operation: film strength is the element of a gear oil which prevents wear. To obtain high film strength, extreme pressure additives are placed in the lubricant. At a temperature of about 250° — often encountered in heavy-duty equipment operation — these additives can oxidize, as they

have in the competitive oils seen above. When this oxidation occurs, the oils become extremely corrosive and rapid wear results. Tests prove that D-A Universal Gear Lube does not corrode, even at temperatures as high as 300° F.

D-A Universal Gear Lube does not sludge or oxidize under high operating temperatures because D-A research has established successful means of retaining the stability of D-A's high-quality base oil while maintaining the high film strength necessary for extra-heavy-duty equipment operation. For greater protection of *your* equipment under heavy

load and high temperature conditions, specify D-A UNIVERSAL GEAR LUBE.



Lubricating heavy-duty equipment across the nation since 1919.

D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.

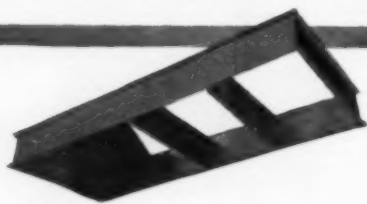
ROADS AND STREETS, June, 1959

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THE NEW CLARK TRANS-PLANT



**GIVES YOU A PORTABLE
UNITIZED BATCH PLANT**

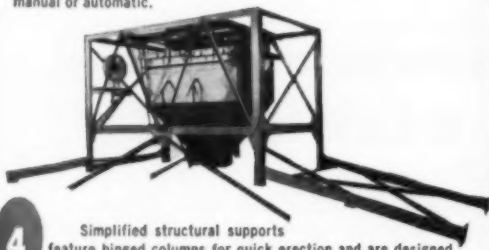


1 Hopper section with or without extension, compartmentized to suit your requirements for capacities up to 200 tons.



2 Structurally re-enforced all welded construction for maximum strength.

3 Weigh batchers up to 6 cubic yard capacity to meet any requirements either manual or automatic.



4 Simplified structural supports feature hinged columns for quick erection and are designed so drive through can be in either direction.

See your local **Clark dealer**
for information on the complete
Clark line of construction equipment



construction equipment division
375 EAST FIFTH AVENUE • COLUMBUS 1, OHIO
A DIVISION OF CLARK GRAVE VAULT CO.

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Prestressed Concrete Training Courses Inaugurated

The first of a series of four Short Courses to acquaint engineers, architects and inspectors on specifications and inspection of prestressed concrete, has been held by the Prestressed Concrete Institute. The courses each included two days of classroom training and one day of field inspection. The courses are being conducted by Jack Janney, consulting engineer, of Glenview, Illinois, and Richard Elstner, structural engineering, PCA Laboratory, Skokie, Illinois. The courses are sponsored by the Prestressed Concrete Institute as part of its expanding public educational service.

The first course was held in Charlotte, North Carolina, March 5, 6, 7, 1959.

Attendance to the courses is limited to two persons from each consulting engineer or architectural firm; four individuals from each state highway department, and one person from each Active Member (producer) firm of PCI, in the following states: Maine, Vermont, Massachusetts, Rhode Island, New Jersey, Maryland, North Carolina, South Carolina, Georgia, New Hampshire, New York, Connecticut, Pennsylvania, Delaware, West Virginia, Tennessee and Florida.

Further information may be obtained by writing Peter J. Verna, Jr., president, PCI, P.O. Box 5247, Charlotte, N.C. Announcement of the time and place of additional courses will be made at a later date.

Kansas Has Aerial Survey Section

Another state which has chosen to acquire equipment and set up a full fledged aerial surveys and photogrammetry section is the Kansas highway commission. Choosing this continuing department rather than the hiring of consultants on an "as needed" basis, the Commission has purchased a Wild aerial camera from Switzerland installed in a Cessna plane and has begun its work.

One of the first jobs designed to this aerial service was a project near Topeka where a ground survey party was stopped by an irate landowner who would not let engineers on her place.

"Photogrammetry is not a complete answer to such a situation," said a spokesman for the new department, who explained that ground control is still necessary to establish horizontal and vertical control points that will show on aerial photographs.

• Traffic accidents on U. S. highways during 1958 caused more than 2,825,000 injuries—up 12 percent over 1957—although deaths decreased 5 percent, according to statistics compiled by The Travelers Insurance Companies.

• Excessive speed was by far the biggest single cause of traffic accidents that caused more than 2,825,000 injuries and 36,700 deaths on U. S. highways during 1958, The Travelers Insurance Company reported in its latest highway safety booklet.

• ROAD EQUIPMENT COMPANY, INC., New Orleans, La., is a new distributor for Highway Equipment Company, Cedar Rapids, Iowa. They will handle the "Hi-Way" line of ice control and bituminous paving equipment.



Blaw-Knox Concrete Paving spread used by McGeorge Contracting Company lays the first 5-inch for steel mesh on Interstate Route 91 near Little Rock, Arkansas. A second 5-inch completes the 10" slab.

from forms to finisher...

McGeorge Contracting uses Blaw-Knox Concrete Paving Spread on Interstate Paving Project

By use of coordinated Blaw-Knox Concrete Batching and Paving Equipment, McGeorge Contracting Company completed a three-mile section of Interstate Route 91 near Little Rock, Arkansas, within the allotted contract time. The company, long a leading highway and heavy construction contractor in Arkansas, chose the Blaw-Knox spread for this major concrete paving job.

A Blaw-Knox 200-bbl. Hi-cement bin served as a rail-head transfer unit. The two-stop batch operation included a 400-bbl. Hi-cement bin and a P-3100 G aggregate

bin set with a twin aggregate weigh batcher. Batch trucks moved dry material to the Blaw-Knox 34-E Dual Drum Paver. Running on 5,000 feet of Blaw-Knox 10-inch road forms was a Blaw-Knox concrete spreader, followed by a Model XE finisher equipped with the new Blaw-Knox quick adjustable screed.

Specially engineered Blaw-Knox concrete paving equipment has what it takes to turn out high production to the tightest specifications, at a profit. Your Blaw-Knox distributor has the details. Why not contact him?



BLAW-KNOX COMPANY

Construction Equipment • 300 Sixth Avenue • Pittsburgh 22, Penna.

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Operator demonstrates hydraulically controlled side-shifting action of blade on 6-wheel Austin-Western power grader.

All-purpose Austin-Western graders speed highway project... shorten job by 2 months

"We completed a 3-mile dual highway project 2 months ahead of schedule with the help of our three Austin-Western graders," says Charles Solomon of S. D. Solomon & Sons, Pontiac, Mich.

Versatile A-W's unsurpassed

He tells us, "The A-W's are versatile machines. They can do many more kinds of work than any other single grader sold. They're unsurpassed for jobs in sand or tight corners. They do rough or finish grading, sloping and ditching equally well. We have three Austin-Westerns—a 4-wheeler and two tandems. Maintenance on these machines has been very low.

"As far as I'm concerned, Austin-Westerns are the best graders sold. They far outperform any other grader made."

Austin-Westerns feature exclusive all-wheel drive and steer on both 4 and 6-wheel models. You move more dirt farther and faster with an A-W because of power up front. No dead weight front end to push around.

All-wheel steering permits you to steer the rear to compensate for powerful side-thrust of a fully loaded blade. You can use the full 13-ft. moldboard and still

grade ahead in a straight line. Front and rear steer provide amazing maneuverability for short radius work. An A-W can work in close quarters where other graders cannot.

Built to outperform

Austin-Westerns are quality built to outperform! Maintenance requirements are low. Distributor service is excellent. Choice of gas or diesel power. Torque converter optional. Hydraulic controls reduce operator fatigue . . . increase his efficiency.

Learn how Austin-Western graders can speed your jobs to give you added profit! See your nearby A-W distributor or write us today.



Rear steering permits operator to offset machine for extra blade reach in this finish grading operation.

Austin Western



CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

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JOB SAFETY

Highway Job Safety Program for Michigan

The Michigan state highway department has launched a safety campaign designed to reduce the cost of accidents to highway construction workers by an estimated \$2.5 million in the next few years.

Highway Commissioner John C. Mackie said that starting in June, highway construction bid proposals will spell out safety precautions to be required of contractors during performance of construction work for the state.

These requirements were not previously listed," Mackie said. "The contractor will be required to comply, and his future prequalification or bidding privileges will be determined, in part, on how well he complies with the new safety program.

The program has been approved by the highway department's Industry Committee and has the general approval of the highway contractors. The eight-man Industry Committee serves as an advisory board to the highway commissioner on the highway industry's views in the state road building program.

"Our figures show that highway construction accidents, aside from human suffering involved, cost an average of \$31,000 per million dollars' worth of construction awards," Mackie said. "On this basis Michigan's five-year \$800,000,000 construction-award program currently underway could save about \$2½ million if accident rates were reduced by even one tenth. Accident reduction also would soon be reflected in lower construction bids."

The program, under the direction of E. D. Suino, the Michigan department's special assistant to the director of engineering, will develop a manual of general safety requirements to be included in the Department's standard specifications. It will require contractors to keep detailed records of all accidents during construction and furnish copies to the Department. It will also require a contractor, after he has been awarded a contract, to submit a construction safety program proposal covering the project he will build for approval.

Fire Hazard in Welding and Cutting

The worker with the torch or electrode in his hand is all too often heedless of the destructive fires the tool can set off. That is why cutting and welding stays high among fire causes.

"Sparks Astray" is a new National Fire Protection Association folder to deal with the situation. Designed primarily for the welder and cutter himself, it forcefully points out that a fire from his torch or arc can cause him injury or even cost his life, throw scores of plant employes out of work, and destroy property worth millions.

The four fire sources are listed with a graphic portrayal of danger spots—explosive mixtures of flammable gases, vapors and dust; fire tempters like oily waste; cracks and openings through which sparks may reach combustibles; and places where sparks or hot metal may lodge to smolder unnoticed.

The folder was prepared with the assistance of the NFPA Committee on Cutting and Welding Practices. Copies are available from National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass., at \$3 per 100, \$23.50 per 1000 and \$21.50 per 1000 in quantities of 10,000.

Highway Needs Study Made for Ontario

The Ontario department of highways, at Toronto, has recently submitted a comprehensive report of the condition and needs of the highways and streets of the province. The total 20-year estimated need for construction and maintenance is \$7.1 billion. The report looks to continued rapid population growth for the province, which will have nearly 9 million people by 1969.

Urban street needs will take 40 percent of the total expenditure to bring them up to standard.

Available to planning and administrative officials on request to Fred M. Cass, Minister of Highways, Toronto, Ontario, Canada.

● The 38th Annual Conference of the Western Association of State Highway Officials will be held at Billings, Montana, June 22-26, 1959. Montana's state highway engineer, Fred Quinzel, Jr., is general chairman.



Austin-Western Roller-Compactor combines static and vibratory force to work fines into stone base aggregates.

Austin-Western Roller-Compactors let you lay fewer courses—cut costs!

Austin-Western Roller Compactors do a deeper, faster consolidating job. They combine the advantages of both vibratory and static compaction, assuring maximum density of all types of material and profitable operation.

Vibrates up, rolls down

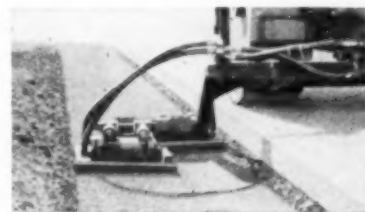
For vibratory compaction, three 450-lb. shoes are attached to a basic 3-wheel roller. Each shoe, hydraulically operated, vibrates approximately 2200 times per minute. This motion extends to the bottom of the lift and then reacts upward, thereby keying low-level material for maximum consolidation in the fewest number of passes. At the same time, the roller unit applies static pressure so as to effectively seal the surface.

There is more profit to be made with an Austin-Western Roller-Compactor. It operates at speeds up to 1 mph. Fewer passes are required because of its efficient double action. Fewer courses are required. It compacts lifts of stabilized material up to 12 in. in successive passes . . . no more need to

remove previous courses if final tests reveal insufficient density.

Designed for rugged service

Maintenance requirements are low. Vibratory units are sealed in oil, completely protected from dirt . . . designed for dependability under rugged service conditions. Available now for Austin-Western and most all other makes of 3-wheel rollers. Get full information today on the cost cutting Austin-Western Roller-Compactor. See your nearby A-W distributor or write to us.



Vibratory widener attachment—for use with any 3-wheel roller equipped with A-W Roller-Compactor unit . . . may be mounted left or right.

Austin Western



CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

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GIANT PRODUCTION! LOW-COST OPERATION! GET 'EM BOTH IN THE MIGHTY D9!

From every angle the Cat D9 Tractor is a "take-charge" giant...capable of giant production. Here's 30 tons of steel engineered and manufactured into a rugged, reliable machine that refuses to falter when the going gets tough.

The heavy-duty, seven-roller track frame is built to take the punishment of heavy loads. "Hi-Electro" hardening of wear areas of the undercarriage gives extra dependability. Extra-strong frame and final drive form a backbone built for long life under the severest operating conditions.

The turbocharged D9 Engine puts out 320 HP at the flywheel. 'Dozing, pulling or pushing — this means peak production on any job. Despite its size and power, the D9 is easy to operate. Hydraulic boosters provide power for steering, braking and master clutch use. Finger-tip control helps keep the operator at top efficiency.

The D9 is easy and economical to maintain. The exclusive Caterpillar oil clutch operates up to 2,000 hours — one whole season — without adjustment. And it needs adjustment no more frequently than ordinary clutches need replacement. Proper track tension is quick and easy to apply with Cat hydraulic adjusters.

NEW FEATURES FURTHER REDUCE MAINTENANCE COSTS: Lifetime lubricated rollers and idlers — tested for 2½ million hours — need no servicing until rebuilding. New dry-type air cleaner removes at least 99.8% of all dirt and

dust from engine intake air throughout every service hour. Cleaner can be serviced in 5 minutes; filter element re-used.

A complete line of attachments and scrapers make the mighty D9 a versatile profit-maker. Scrapers available for use with the D9 are the No. 463 Series C, which carries 22 cu. yd. struck, 28 heaped, and the No. 491 (27 cu. yd. struck, 34 heaped). Fast loading, efficient ejection and spreading step-up cycle time with either one. A full line of bulldozers and controls insures the right combination to handle any 'dozing job. Two rippers are available... the No. 9 for normal ripping and the Kelley Ripper with single tooth for extra-deep penetration.

These are just a few of the plus features found in the D9 Tractor — features that make the D9 "King of the Crawlers." The real proof is in a demonstration on your job. See for yourself. Call your Caterpillar Dealer now.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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**GET TOP
PRODUCTION WITH
A TAKE-CHARGE D9**

... for more details circle 291 on enclosed return postal card

Dynamiting Did It Where Drop Ball Was Out of Bounds

This job is a reminder that fractional-stick shots with mats can do remarkable things in close quarters, in the hands of the experts.

By William F. Hallstead

Special to Roads and Streets

Controlled demolition with explosives to remove old concrete, instead of jackhammers or drop ball, was the answer to an unusual problem here described. The job involved was a bridge widening. Ordinary methods couldn't be used because the vibration might hurt utility piping on the bridge. A rail line immediately below was another ticklish factor in a bridge pylon demolition job that plagued a contractor for a full month in Washington, D. C. Dynamiting finally did the trick in a 3-day period.

Early in 1959, work began on the \$200,000 contract to widen the existing bridge that carries New Hampshire Avenue over the Baltimore & Ohio's main line. The structure was to be widened 11 ft. on each side to provide 6 lanes of traffic instead of four.

The problem lay in the removal of four sturdy reinforced concrete pylons, vertical extensions of the abutment ends that served as decoration and as support for the concrete parapet and cast aluminum railing. The railing and parapet

were knocked out easily, but when it came to the pylons, each of which extended some 8 ft. above the bridge seat, it was a different matter.

The bridge carried an 8-in. gas main and an 18-in. water main, and the damaging jar of a headache ball was out of the question. The contractor attacked the pylons with two jackhammer crews, but the pylons were stubborn. He tried feathers and wedges, then a rock jack. But the heavily reinforced pylons stood firm after a month of attempted manual removal.

In mid-March, the dynamiting firm of Burnbrae, Inc., was cleared by the City of Washington to use explosives on the reluctant pylons. Although the original contract had prohibited the use of dynamite over

the railroad, officials of the B&O agreed to it on the city officials' high opinion of the explosives firm (Burnbrae in 1957 had very successfully dynamited three condemned 8-story buildings in the heart of Washington). Railroad traffic was not to be interrupted. A flagman was stationed half a mile from the bridge along the tracks in both directions and each was provided with a telephone to a third safety man at the bridge site.

The first shot in each pylon used four holes up to 4 ft. deep drilled vertically in the top of each column. Each blast hole was loaded with one-half stick of Du Pont 40% Special Gelatin. One charge was primed with a Du Pont instant cap and the others with Du Pont mil-



● Push-down detonator was used in firing the few light charges involved. Force of shot was well controlled, and truck crane stayed in position. Mat didn't have to be detached.



- Loading was done quickly and efficiently with the same truck crane that placed blasting mats. Labor and equipment were supplied by prime contractor. Burnbrae handled all explosives placement and firing, supervised drilling, and supplied dynamiting materials.

lisecond (MS) delay caps in three delay periods: MS-25, MS-50 and MS-75. The use of MS delays spread concussion and vibration, and no more than 1/2-stick was detonated at any given millisecond instant. Through the careful use of MS delay caps, Burnbrae was able to control vibration to the point where it was actually negligible.

The firing of the first charges in each pylon neatly broke loose its upper portion. The next set of charges was placed in five blast holes 2 1/2 to 3 ft. deep, drilled in the chunk of concrete initially knocked loose. This second series of 1/3 stick each was primed with one instand cap and four MS delays: MS-25, MS-50, MS-75 and MS-100. It broke each severed pylon top into fragments small enough to load easily.

The third firing consisted of five blast holes, 4 ft. deep, drilled vertically in the remaining portion of each pylon. These were loaded with a half stick each, capped as in the second firing. This series completed the demolition of the pylons to within 1 ft. of the bridge seat elevation.

The fourth and last shot, a similarly light loading, clipped off the remaining outside corner of each column stump near the bridge seat level.

Outstanding in each of the more than a dozen separate firing was the excellent control of debris. Prior

to each shot, the pylons were covered with two 12 x 12 ft. one-ton, 5/8-in. cable blasting mats placed with a truck crane. No large fragments fell on the double-tracked railroad, and there was no case of rail traffic being detained for any reason.

The only sizeable debris permitted to fall was the final outside corner of each column at the bridge seat level. This was covered with one mat hung vertically to prevent fly. After the shot, the small amount of debris involved was dropped straight down to fall behind the temporary timber barrier walls built for the purpose.

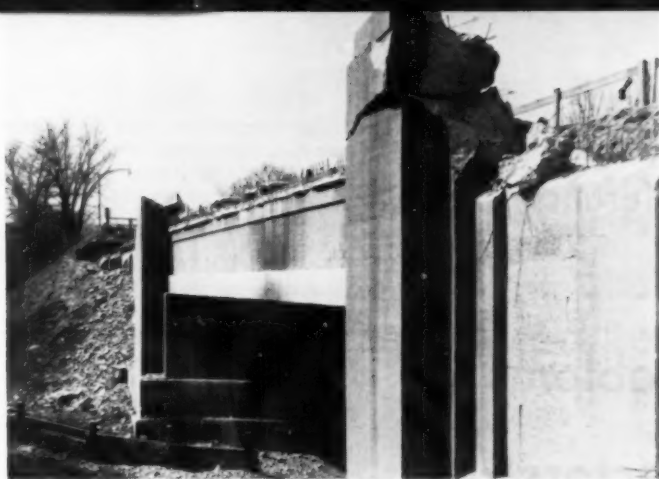
On the first day of shooting, a large group of city officials and somewhat apprehensive railroad



- Depths of blast holes were adjusted to cause major debris to topple inward. Pylons were heavily reinforced, but explosives cut the bars nicely.

- Showing excellent control of fly. Men in background, having seen several previous blasts, showed no concern whatsoever. Photographer was permitted to get close shot.





● South elevation of bridge, showing pylons in second day of blasting operations. Note temporary timber retaining wall placed to prevent fragments from rolling onto RR right-of-way.



● "Powder man" seen tamping charges in place in vertical blast hole.

representatives was present. The cautious police completely cut off traffic and routed it around the bridge along a lengthy detour. But Burnbrae, specializing in tightly controlled demolition, has achieved excellent limitation of concussion, vibration and debris. As testimony to this, on the following days the total lack of nervous officials was obvious, and traffic was permitted to use the bridge except

during moments of actual firing. Said Jack D. Loizeaux, president of Burnbrae, at the completion of the work, "A great deal of time and money could be saved if imaginative dynamite demolition were used more often in difficult jobs like this one."

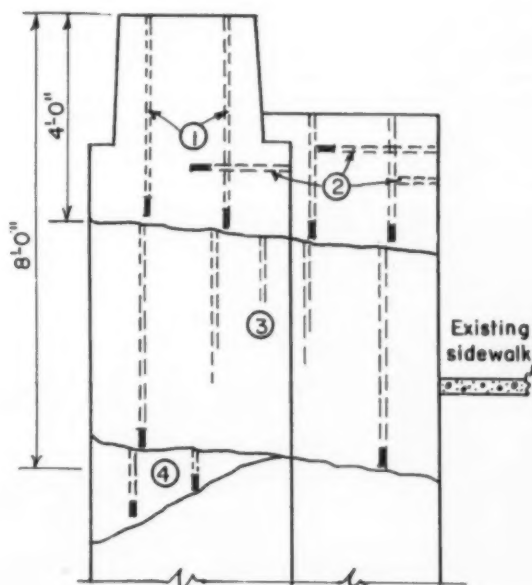
The superintendent for the prime contractor estimates that the use of controlled blasting has saved at least a month in the construction sched-

ule. The widening is expected to be completed late in 1959, and will include two 33-ft. driving lanes (six vehicles), a 6-ft.-wide raised mall, 6-ft. sidewalks, a parapet wall and aluminum handrail.

The prime contractor is S.T.G. Construction Co., Inc., New York City; Harry L. Elerding, superintendent. In charge of blasting force, Burnbrae, Inc., of Baltimore.

Blasting Sequence for Stubborn Pylon

- 1 Four holes, up to 4 ft. deep, $\frac{1}{2}$ stick in each, with instant and MS-25 to MS-75 caps, make initial cut.
- 2 Five holes up to 3 ft. deep, drilled horizontally, loaded with $\frac{1}{3}$ stick each, capped with instant and MS-25 to MS-100, fracture initial chunk for loading.
- 3 Five holes, 4 ft. deep, loaded with $\frac{1}{2}$ stick each, instant and MS-25 to MS-100 caps, fracture remainder of column to 8-ft. depth.
- 4 Final corner is removed with similar light charges.



ARBA-BPR Joint Conference

Looks at

New And Old Problems Affecting Contractors

New specifications and developments which will affect contractor's pocketbook were aired at meeting held April 6 in Washington, D. C.

Advantages and feasibility of long-range highway construction programming, and the application of "end-result" specifications, were high on a long list of topics discussed recently at a joint meeting of the Committee on Specifications and Development, Contractors Division, American Road Builders' Association, together with representatives of the Bureau of Public Roads.

The meeting was concerned with two major ARBA projects:

1. The 1959 Task Force Review of practices and procedures in the highway contracting industry. This report was expected to be completed during the late spring weeks.

2. A further study of new developments, a study which will include some subjects suggested by the Task Force findings, as well as other subjects of more recent ori-

The contractors plan to coordinate their efforts with those of other divisions and technical committees of ARBA, and to present their findings and viewpoints to the Bureau of Public Roads and, through the joint AASHO-ARBA cooperative committee, to the American Association of State Highway Officials.

The committee chairman, Archer B. Gay, engineer-director of the Virginia Road Builders Association, said, "The understanding and cooperation of the Bureau of Public Roads regarding highway problems are most gratifying."

● Long-Range Programming Vital.

Several members of the committee expressed the belief that the maintenance of a five-year program, together with a one-year schedule of firmed-up projects, is of major importance in stabilizing the construction industry and attaining a smooth flow of work. Such long-range programming, it was felt, encourages orderly scheduling and makes it easier for the individual contractor to bid on the projects for which he is best equipped. It brings all kinds of economies to the highway industry and important benefits to the Federal and state governments.

The subject of "end-result" specifications was discussed at length from several aspects. It was agreed

(Continued on page 121)

Contractors' viewpoints on highway construction problems were discussed in Washington at a joint meeting. Pictured clockwise around table from left: Ed. G. Langston, Orlando, Fla.; Sam P. Turnbull, engineer-director, Florida Road Builders Assn.; Ralph Heffner, Celina, Ohio; William E. Hardy, executive secretary, Maryland Highway Contractors Assn.; John Laing, Bureau of Public Roads; Burton F. Miller, deputy executive vice president, ARBA;

H. A. Radzikowski, chief, division of development, Bureau of Public Roads; Archer B. Gay, engineer-director, Virginia Road Builders Assn.; William Dillon, BPR; W. Guy Gunn, managing director, Contractors Division, ARBA; E. N. Rodgers, engineer-manager, Alabama Road Builders Assn.; S. Howard Brown, Grantville, Pa.; and John J. Curtin, Jr., Washington, D.C.



What Has Happened to Maintenance?

By Ben H. Petty

Professor of Highway Engineering
Purdue University

In my book, there is no more important group in *any* highway organization than the maintenance department. Yet, in many state, county and city highway departments maintenance represents the "political patronage catch-all." What can you expect from such a set-up?

It requires years of dedicated, thoughtful, painstaking experience to develop an honest-to-God maintenance man. He learns the necessary "know-how" from a combination of trial and error, common sense, *unhampered* application of continually improving judgment and real *desire* to conserve the taxpayers highway investments. Frequent political turnover nullifies all this!

Handbooks and standards of procedure, so prevalent in the design and other areas, are few and far between in the area of maintenance. Almost daily, these maintenance men are faced with new and different maintenance problems. "What to do?" comes up every day, and only the experienced maintenance man can come any way near the best answers. And about the time he reaches the stage of at least reasonable competency, along comes a political change of atmosphere and out he goes on his ear. His inexperienced successor will likely squander maintenance funds for a few years until he learns by experience. Then he is subject to the political axe and we start the costly training process all over again.

Why isn't maintenance considered by highway officials as on a par with location, design, construction, testing, etc.? After all, the job of the maintenance department is

to make the best out of any errors in location, design and construction, and strive continuously to *conserve* our tremendous investments in roads, streets and bridges.

This requires *prompt* and *adequate* maintenance operations. And I wish to emphasize the desirability of promptness. A small break in a pavement can be adequately patched at reasonable cost. But if neglected, they get bigger by the hour under the destructive effects of heavy traffic, rain-fall and freezing effects. After months of neglect, it may cost ten times as much to repair. And in the meantime tires and springs are damaged, nerves are jangled, accidents happen, and that priceless *good public relations* takes a nose dive. And we could add such maintenance neglect as low or high shoulders, poor or no drainage, and many other obvious items.

If the maintenance budget is inadequate, then let's provide more men, money, materials, and machines to do the job promptly and *right*. It doesn't seem proper to me to be pouring billions of dollars into new construction and, *at the same time*, let our present pavements go to *hades*.

This may seem overly rough, but it is high time someone said it. To those highway departments who are doing a good job of maintenance, my hat is off.

Sure, newly constructed pavements should, for several years have lower unit maintenance costs than the old pavements. But we are going to have tens of thousands of miles of old pavements with us always. Let's do our best to conserve the tremendous investments therein, throughout their useful lives, by prompt and adequate maintenance.

As A. R. Hirst, former Chief Engineer, Wisconsin State Highway Department said some 35 years ago, "Let's keep what we have 'till we get more to keep."

Tractor Shovel Clears Giant Boulders

When California US 40 was blocked last autumn, a four-yard rubber-tired unit lifted 10-tonners and gave a rather remarkable account of itself in the hands of a courageous operator.

In the rugged mountain country of eastern California, US Highway 40 twists and curves past the little towns of Colfax, Alta, Baxter and Emigrant Gap on its way east to the Donner Pass. Tall pines, mud holes, boulders and patches of fresh snow cover the hillside. Cars and trucks hurry past; a long freight train rumbles by, farther up the mountain slope.

This was the early-winter picture when—WHAM, down came a tangle of trees and mountainside . . . ROCK SLIDE!!

Over 100,000 cubic yards of mud, rock and earth tore away from the hill near Alta, California. The muddy wave knocked down trees like match sticks and tumbled huge boulders. It picked up speed as it crashed onto Highway 40, dumping its load across the road shoulders and pavement.

To clear the mess and repair damage, the California division of highways called for bids. J. O. Archibald Company, general contractors of Redwood City, was awarded the job. Archibald rushed his normal earthmoving fleet of scrapers, tractors, shovels and trucks to clear the highway and

stabilize the hillside by terracing. But as the crews cleared away the mud and rock and volcanic ash and sandstone, they found that the

boulders required special treatment. The contractor didn't want to blast any more rock than necessary because handling hose lines and compressors slowed down the earthmoving equipment. And blasting adds to the cost. Also, why aggravate the terrain with any more vibrations?

● *Special Rock, Special Tool.* So Archibald scanned his equipment roster, then selected a nearby tractor shovel that was loading out 18- to 20-yd. haul trucks in four passes. His machine—a "Michigan" Model 275A tractor shovel—swung a big bucket, all right. Would it be big enough to handle the big rock? It was designed to pick up shot rock and over-sized stone. But a boulder 10 ft. in diameter? How over-sized can you get?

It became the task of operator F. E. "Mac" McKinsey to find out just what the 275A could do. Mac had put in lots of time on Archibald's 2¾-yd. "Michigans"—in fact had clocked almost 200 hours on the 4-yd. machines. The question: What could the 275A do half-way up a mountainside, working in treacherous muddy footing near gullies and on steep slopes?

While other equipment worked on normal earthmoving and terracing operations, Mac started to work. He found he had to move boulders big enough to plug a



● Some of the boulders picked up by Mac's Michigan 275A were so big that he couldn't see over them. Answer: he toted them in reverse.

culvert. And not just move them from here to there. Archibald was required to dump excess fill in a gully about a half-mile from the center of the slide.

● **Moving the Big Rock.** Mac would first edge his bucket lip under a giant boulder, which stuck up bold and bare, after the regular earthmoving crews had given up. He'd slowly work the hydraulic controls, gently raise and tip the

bucket as he'd feel his way under the rock. If he could lift the rock, more than likely he could carry it. He kept the load low—just off the ground.

Still, the rock was often so big that he couldn't see over it. Then Mac would drive in reverse to see where he was going. Power steering and identical speed ranges in forward or reverse made this easy. These boulders weighed as much as 8 tons. When they got over 10 tons

or so, or were so odd-shaped that Mac couldn't scoop them into the bucket, he'd simply *doze* them the half mile to the edge of the gully.

"I almost felt like a hero on this job," was Mac's later comment. "When one of the mechanics saw me move those big rocks he took out his Polaroid camera and shot pictures of me—gave me a print right away. But it wasn't only because of the rock and that the 'Michigan' eliminated blasting. I ran up steep slopes with the machine where even a six-wheeler couldn't climb. I plowed right through mud where a small crawler tractor lay stuck."

This job, long since cleaned up, is another example of the growing stature of the big, new, mobile tractor shovels now available to the contractors.



● Some of the "block busters" were so big that the tractor-shovel had to doze them along, sometimes several hundred feet, to the dump.

FRAMES AND ARCHES: CONDENSED SOLUTIONS FOR STRUCTURAL ANALYSIS: By Valerian Leontovich. 494 pages, 6 x 9, 523 illustrations. McGraw-Hill Book Company, 327 West 41st Street, New York 36, New York. Price \$20.00.

Over 400 condensed solutions for 20 principal types of statically indetermined frames and arches are given. Only simple algebraic equations are required in order to use the book.



● The tangle of odd trees, mud, rock and boulders, as it looked before the clearing crew took over.

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**BEST BUYS IN NEW
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Surety Leaders Hear Blunt Words

The president of AGC takes certain elements of the surety bond fraternity to task in a talk given at the National Association of Surety Bond Producers' meeting, held April 3 in New York City. Following are excerpts from this talk which apply particularly to the problems of highway contractors.

By James W. Cawdrey

President, Associated General Contractors of America

I believe that the cost of the bond between owner and general contractor and between general contractor and subcontractor is, like the architect's fee, a sound business investment reasonably priced.

However, I also feel there is still considerable left to be desired, as far as some surety people are concerned. I feel that in the past the loosely supervised method of handling bonding credit by some surety people and their representatives, has played no small part in our arriving at the dilemma the construction industry is in today, known as our "profitless prosperity."

I am speaking of the free hand that some surety agents have had

in obligating their respective bonding companies in guaranteeing the performance of a construction contract by firms who were neither financially capable nor had the ability, the experience or the organization to do the job that was called for under the contractual obligation with the owner.

You must agree that the contractor who for years has operated within the limits of his available organization is the contractor most likely to weather today's storm of competition.

• *Joint Ventures Often "Good."*
When a contractor has under way
(Continued on page 122)

- Loosely supervised handling of bonding credit is blamed largely for the present "profitless prosperity" of the contracting industry.
- Joint ventures are recommended to bring mutual aid to old and young firms, where each can contribute something the other needs.
- Some bonding houses have encouraged contractors to bid suddenly expanded work programs. Most contractors need to grow more slowly in order to remain sound.
- Borrowed credit is a poor substitute for ability and experience.
- All subcontractors—not just the ones that seem to have the lowest bid—should be required to furnish a performance bond, in fairness to all.
- There are too many irresponsible contractors, or firms bidding on work which for various reasons they are not capable of handling.
- Contractors favor pre-qualification. The bid bond, in a sense, is that.

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No. 955 excavates part of a total of 19,000 yd., preparing for base an area 20 ft. wide, 12-13 in. deep. Cuts are made by Cat No. 12 Motor Grader and windrowed. Job is part of a \$1,828,366 project by Gulf Bitulithic Co. on U. S. 75, to be part of the Interstate Highway System.



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Some "Do's and Don'ts" of

The fine points learned in the post-war years are summarized in this review. Details such as these have markedly reduced sawing costs and enabled operators to get longer life from the saw rig as well as the blades.

By Robert Janowitz

Manager, Engineering Department, Clipper Manufacturing Company

Concrete sawing has become widely accepted as a means of controlling random cracking and providing contraction joints in highway pavements. For patching and trenching it eliminates ragged edges and allows for a better bond of the replacement concrete, resulting in a more permanent patch.

In the short span of ten years, many changes have taken place in concrete sawing. The early, low-powered, hand-pushed saws have given way to larger and more powerful self-propelled machines. The life of diamond blades has been extended greatly with the advent of tungsten-carbide bonds. Low cost, silicon carbide type abrasive blades can be used to cut green concrete in many places and have slashed cutting costs dramatically.

The increase in competition and higher labor costs make it vitally important to operate efficiently. This requires proper selection and maintenance of equipment, correct sawing techniques and the right selection of blade specifications.

● **Equipment Selection.** In paving the most widely used saws are the 36-hp self-pelled models, which are positioned by the operator, such as the Clipper ConSawMatic saw. (Fig. 1.) These saws are powered by a 4-cylinder VG4 Wisconsin engine and are rugged and heavy for continuous use. This makes them also appropriate for other heavy cutting such as curb-widening and large trenching operations in existing pavements.

For smaller paving jobs and occasional patching and trenching jobs, the lower cost 30-hp saws are preferred. Their lighter weight makes them more maneuverable and the power developed by the VH4 engine (which is about 26½ hp at the operating speed) is usually adequate.

Both these types of saws provide great flexibility in operation. They can cut longitudinal or transverse joints and can be moved around easily. However, the last few years have seen the development of large special-purpose saws such as the Clipper longitudinal saw (Fig. 2). If the job is

● Fig. 1. A 36 hp saw shown in a trenching operation on a concrete street, using a diamond blade. These saws are equally efficient on large paving projects.



Concrete Sawing

big enough these machines soon pay for themselves in reduction of labor cost, as one saw will often do the job of two or three conventional types. In highway locations where frequent overpasses, ramps, and other interruptions are encountered, these machines are not as quickly re-positioned, and in these cases the smaller saws are advantageous.

Contractors have found it extremely important that the right blade and the right saw team up for best economy and most efficient results. Consult the manufacturer when in doubt.

● *Equipment Operation and Maintenance.* Considering that concrete saws cost almost as much as a new car, it is surprising how little attention is often given to proper breaking-in, maintenance and storage.

You would not take a new car and run it at 90 mph, but many operators will run a new engine at top speed and maximum load from the very beginning.

The following suggestions apply to all makes of concrete saws, and if followed carefully, will prolong their useful life many times.

1. A new engine should be operated at low speeds (1000-1200 rpm) for an hour without any load. The speed should then be increased gradually over a period of two hours until it is up to governed speed. Only after this break-in period should the engine be subjected to any load. If the saw has a water pump it should be disconnected during this period.

2. Always operate the engine at proper governed top speed. Blade life can be seriously reduced if the engine is running too slowly. For the same reason, don't use 12-in. diameter blades on 18-in. blade capacity saws, which have a slower blade shaft speed.

3. Concrete sawing creates a sludge which is deposited on the engine cooling fan and in the air passages. This can cause serious overheating unless removed regularly. Air cleaners must be inspected daily. Crank case oil should be checked daily and changed every 50 hours. Use only regular gasoline.

4. Many saws have hydraulic pumps for raising and lowering of the blade and variable speed transmissions for self-propulsion. It is most important to use the correct oils as specified in these systems. Under no circumstances should brake fluid be added. The transmissions can be damaged seriously if the proper fluid level is not maintained.



● Showing how saw rig can be guided automatically while making longitudinal joint cut.

Two types of water pumps are generally used: Those that have a carbon type mechanical seal and others with a rubber impeller and a separate clutch. In either case avoid running the pumps dry for any length of time; instead, remove the drive belt. A wise precaution is the draining of the water pump at the end of the work period, when frost is expected. If in doubt whether the water in the pump might be frozen, remove the drive belt and rotate the pump pulley slowly by hand.

5. A very important part of the concrete saw is the "V"-belt drive from the engine to the blade shaft. No matter how good the engine is, it cannot transmit full power through loose, badly matched or worn "V"-belts. After the first four hours of operation the "V"-belts should be checked and tightened. After that they should be inspected once a day. If slippage occurs, it will reduce the blade shaft speed and result in short blade life. Replace belts only with properly matched sets, even if just one belt is worn out.

6. Daily greasing of blade shaft bearings and wheel bearings is a necessity. It serves not only to lubricate these parts, but to keep out water. Other bearings, such as pivots, should be greased once a week.

7. Most saws use a chain drive from the self-propelling transmission to "contact" wheels, which bear against the rubber wheels of the saw. Be sure the chain is tight. Clean and oil occasionally. The "contact" wheels must be kept free from accumulations of concrete sludge and curing compound. An important innovation in recent years by Clipper is an intermediate drive wheel which eliminates picking up of curing compound by the rubber wheels and transferring it to the contact wheels.

8. Most concrete saws have a slight tendency to lead off from a straight line when sawing, since the blade is located to the right and outside of the four wheels. Therefore, they require a minimum amount of "steering" to keep them cutting in a straight line. However, most saws have an adjustment built in to compensate for lead-off. When steering becomes too hard, consult the manufacturer's handbook for corrective action.

CONCRETE SAWING

● *Blade Selection.* Two types of blades are used for the cutting of concrete: Diamond blades (Fig. 3) and abrasive blades (Fig. 4).

Diamond blades have segments, made from a sintered mixture of industrial diamonds and metal powders, which are brazed to a steel disc. They are generally used for old concrete, asphalt and green concrete containing the harder aggregates, and must always be used wet. Many grades of diamond blades are available to suit the conditions of the job.

Twelve inch diameter is the most popular size of diamond blades. It allows a depth of cut of about $3\frac{1}{4}$ in. Larger size blades are used for deeper cuts.

For cutting of old concrete, diamond blades $\frac{7}{8}$ in. to $1\frac{1}{8}$ in. wide

are generally used. Of the two, the $\frac{1}{8}$ in. wide blade has a thicker center and should be selected for saws with 25 hp or larger engine, especially when equipped with self-propelling units.

For joints in green concrete, which are to be sealed, a minimum blade width of $\frac{3}{64}$ in. is recommended. Blades .210 and .340 in. wide will cut a sufficiently wide path to meet the requirements of $\frac{1}{4}$ and $\frac{3}{8}$ in. wide joints, which are now being specified in many cases.

A recent improvement has been made in the design of the steel centers. As the technology of diamond bonds developed more wear-resistant blades, it was found that the steel center would wear out first. This was especially acute in certain areas where sharp sand in

the concrete mix tended to produce a condition known as undercutting. What happens is that the steel center wears to a sharp knife edge at the base of the individual segments, allowing them to fall off long before they are worn out.

Diamond blades are now available for our saws with centers that have hard metal inserts under each segment. These inserts resist the abrasive action of the sand and prolong the life of the blades.

Low cost, abrasive blades are now widely used to cut green concrete with some of the softer aggregates such as limestone, dolomite, coral or slag. These blades are made from a mixture of silicon carbide grains and a resin bond, which is pressed and baked. In many cases, even some of the medium hard aggregates can be cut if the step cutting method is employed: Two or

(Continued on page 82)

Sum-Up on Good Sawing Techniques

Careless operation of the saw can ruin blades or shorten their life drastically. When mounting the blade on the blade shaft, be sure that both the arbor and blade collars are clean and free of any accumulated blotters or blade labels. Slide the blade carefully on the arbor and see that it is seated properly. The drive pin must project through the blade and through the other collar. This is a simple operation but it is surprising how many blades are ruined by improper mounting. Tighten the blade shaft nut securely by tapping the wrench with an engine crank or similar object.

Other important details:

1. Keep the blade raised well above the concrete when maneuvering the saw into position and when starting the engine.

2. Turn on the water and be certain that there is a full flow of water to both sides of the blade. The exception is dry cutting with certain abrasive blades which is explained later.

3. Lower the blade slowly and carefully into the concrete. When at the required depth engage the self-propelling unit.

4. The forward speed must now be adjusted correctly. Too fast a speed leads to riding out of the cut where the front wheels of the saw are lifted off the pavement and the weight of the saw is supported by the blade. Or, excessive speed can stall the engine. On the other hand, too slow a speed is not desirable since the blade makes many more revolutions than necessary to cut a given distance, thus causing excessive wear.

5. If the saw should stall in the cut, raise the blade well above the pavement and check the nut on the blade shaft to make sure it is tight before re-starting the engine.

6. If dust is visible, raise the blade out of the cut immediately. Just a few seconds without water can ruin a diamond blade.

7. When short blade life is experienced, check for loose "V" belts, incorrect or pulsating engine speeds, excessive engine vibration, excessive lead-off and, last but not least, proper blade specification.

8. Some operators will reverse diamond blades periodically. This is generally *not* recommended. Although it tends to keep the blades dressed and sharp, it also tends to shorten blade life.

9. An important step after sawing is cleaning out the joints. If this is not done, it is possible for the concrete sludge to harden in the joint and interfere with subsequent sealing. The best way is to flush out the joints immediately with a high pressure stream of water. After cleaning, the joints must be protected from filling with dirt, sand or gravel, prior to sealing. Rope, paper or plastic tape are often used for that purpose.

10. A Growing practice is the dry cutting of green concrete with specially formulated abrasive blades (never diamond blades). Although it reduces the life of the blade, it eliminates hauling of water, which more than makes up for the extra blade cost. Dry cutting often produces a remarkably smooth cut.

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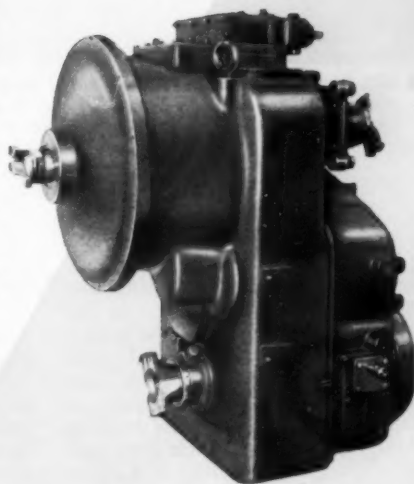


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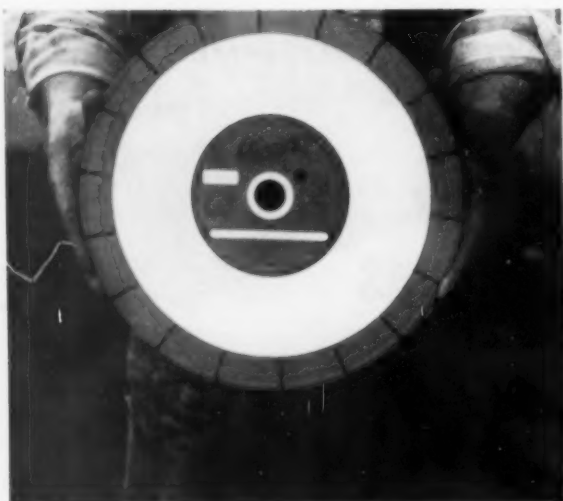


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● Fig. 3. One of a number of diamond blades for concrete and asphalt sawing operations. Specifications used depend on the aggregate used in the concrete.



● Fig. 4. Clipper Green-Con abrasive blades for either wet or dry sawing. Allow sawing as soon as the slab will support equipment.

(Continued from page 80)

more saws cut the same joint, but each one cuts only a part of the total depth. This principle is also used on the longitudinal saw which has two individually adjustable cutting heads. When cutting a total depth of $2\frac{1}{2}$ in., the leading blade cuts about an inch deep and the trailing blade, which is slightly narrower, cuts to the remaining depth.

Abrasive blades are made in 14 in. and 18 in. diameters and in various thicknesses to cut joints from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. wide.

When is the best time to saw green concrete? In the case of abrasive blades, there is only one answer: As soon as the concrete will support the equipment and the joint can be cut with a minimum of raveling. In the case of diamond blades, two factors must be considered. In the interest of long blade life, sawing should be delayed, but

control of random cracking makes it necessary to saw at the transverse joints as early as possible. Where transverse joints are spaced closely, every second or third joint can be cut initially and the rest later. Sawing of longitudinal joints can be delayed as much as seven days or longer.

● **Conclusion.** What of the future of concrete sawing? Constant research is carried on to develop better blades and the effects of diamond grit sizes, concentrations and bonds are being studied. A better understanding of these factors will lead to lower cutting costs.

In machines, greater maneuverability, lighter weight, easier operation and servicing are considered in designs now on the drafting boards.

The concrete sawing industry is ready to meet the challenge of the huge highway program.



● Fig. 2. For production sawing of longitudinal joints, 56-hp Clipper Model C-560 concrete saw features dual blade operation in tandem, each blade individually controlled, for one-pass sawing to any depth requirement. Speed and sawing capacity of this one-man operated unit is reported to be far greater than the amount of paving that can be poured in a normal day's operation.

STUDIES IN HIGHWAY ADMINISTRATION. Bulletin 200. Highway Research Board, 2101 Constitution, Washington, D.C. Price \$1.00.

This 50-page bulletin contains seven papers on highway administration at the state, county, and local levels, as presented at the 37th Annual Meeting of the Highway Research Board.

CATERPILLAR TRACTOR Co. has appointed R. M. (Roger) Woodbridge as general supervisor of the Agriculture, Logging and Construction markets in the Sales Development Division.



● Seared and scarred surface of the Memorial Freeway in Houston, Texas, is pictured before it was repaired.



● Extent of the damage is reflected in this photo of the underside of the bridge deck. Overturned tank truck's flaming gasoline flowed under the bridge.

Gasoline Seared Bridge Gets Plastic Surgery

Cement topping mixture with bonding agent used to restore deck pavement and under-deck surfaces on Houston expressway bridge.

When a gasoline truck explodes and burns on an expressway bridge, what is the best technique for restoring the damaged concrete pavement and structural surface? The question is an important one, especially when the roadway and bridge involved are on a metropolitan expressway carrying 85,000 vehicles a day, as was the case with a recent spectacular accident on Houston's Memorial Drive Freeway.

The accident occurred on a 6-lane concrete bridge. An overturned tanker spilled 6,000 gallons of flaming gasoline over and under the structure, severely spalling the concrete.

As reported by E. F. Mallett of

the Houston department of public works, the bridge was immediately closed and all traffic rerouted. As soon as an inspection could be made the bridge was reopened for limited operation, while the engineers studied whether to repair or replace the structure.

Two choices seemed apparent. One would involve repairing the whole expanse of damaged pavement in the normal manner. Spreading over one outbound and two inbound traffic lanes, the job would have involved cutting deeply into the entire deck area, down to the burned under-surface of the bridge. The second course, not too much more drastic than the first when you consider it: would have

been the rebuilding of the entire bridge.

But a third way proved to be the answer.

Instead of replacing the entire deck or the whole bridge, inspection showed that a surface patch might be applied. It was an answer loaded with discouraging "ifs"—IF the patches could be made to bond, IF it was possible to feather out the patches smoothly and evenly for a complete and acceptable job, and IF the patch could prove "flexible" enough to withstand the bridge vibrations, shear and other forces due to wheels of traffic.

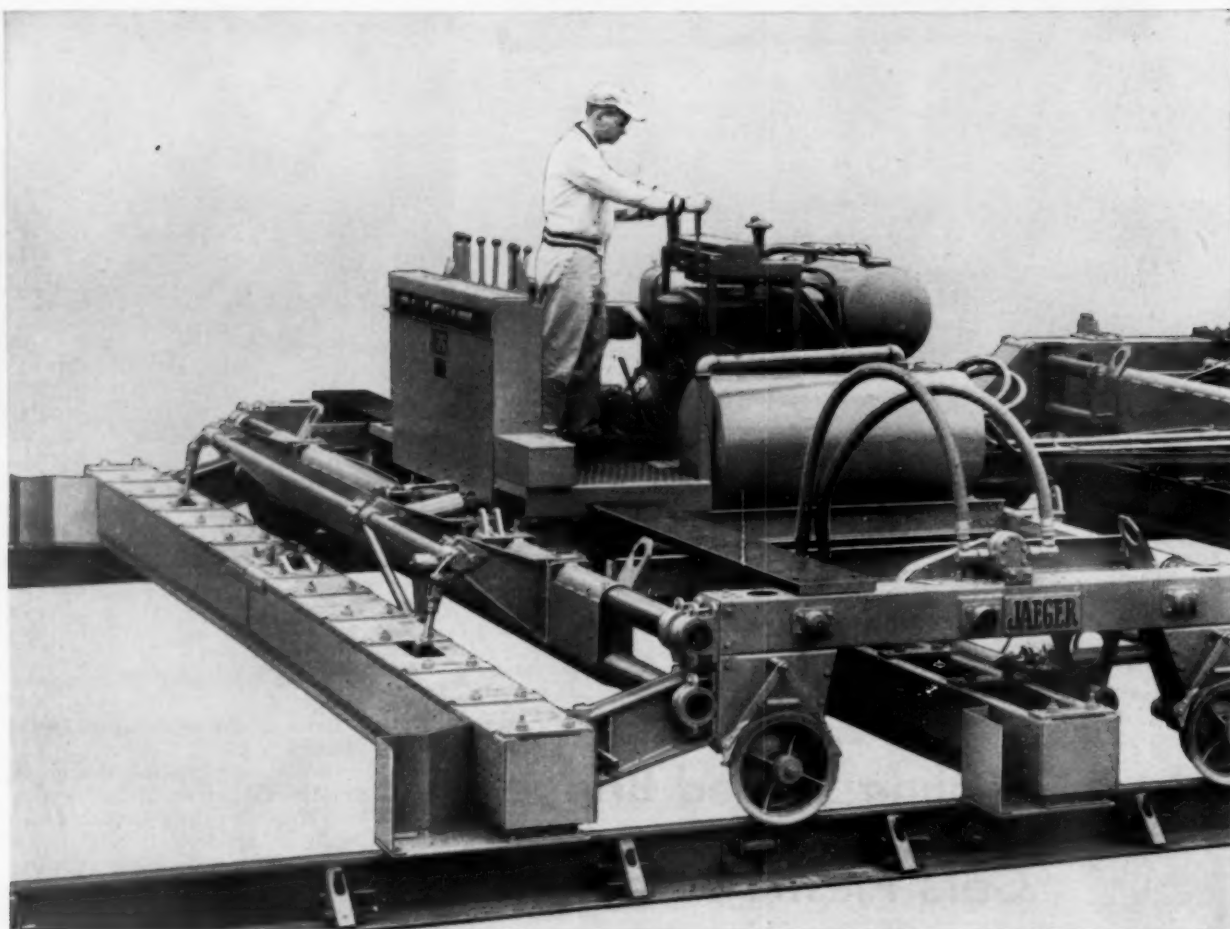
While methods were being considered Houston's department of traffic engineering was preparing for the worst: making studies to determine how 85,000 cars a day could be rerouted while the bridge was out of service. Inasmuch as Memorial Drive is a controlled access freeway, this would have meant cutting a vital traffic artery.

(Continued on page 86)

Patching Mix Used

Square Sieve Openings H.S. Standard Series	Total % Passing By Weight
No. 4	100
No. 8	98
No. 16	78
No. 30	41
No. 50	11
No. 100	0-1

Sharp fine sand 1/16" maximum size. 1 sack cement - 3 cu./ft. sand - 4 gal. Super Bond-sit.



JAEGER FINISHER-FLOAT gives the final machine finish without added labor

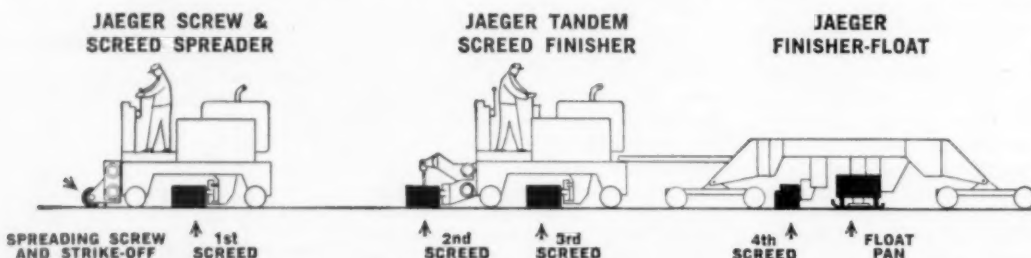
(Towed and operated from any finishing machine)

This is the machine you've always wanted to complete the job behind your finisher.

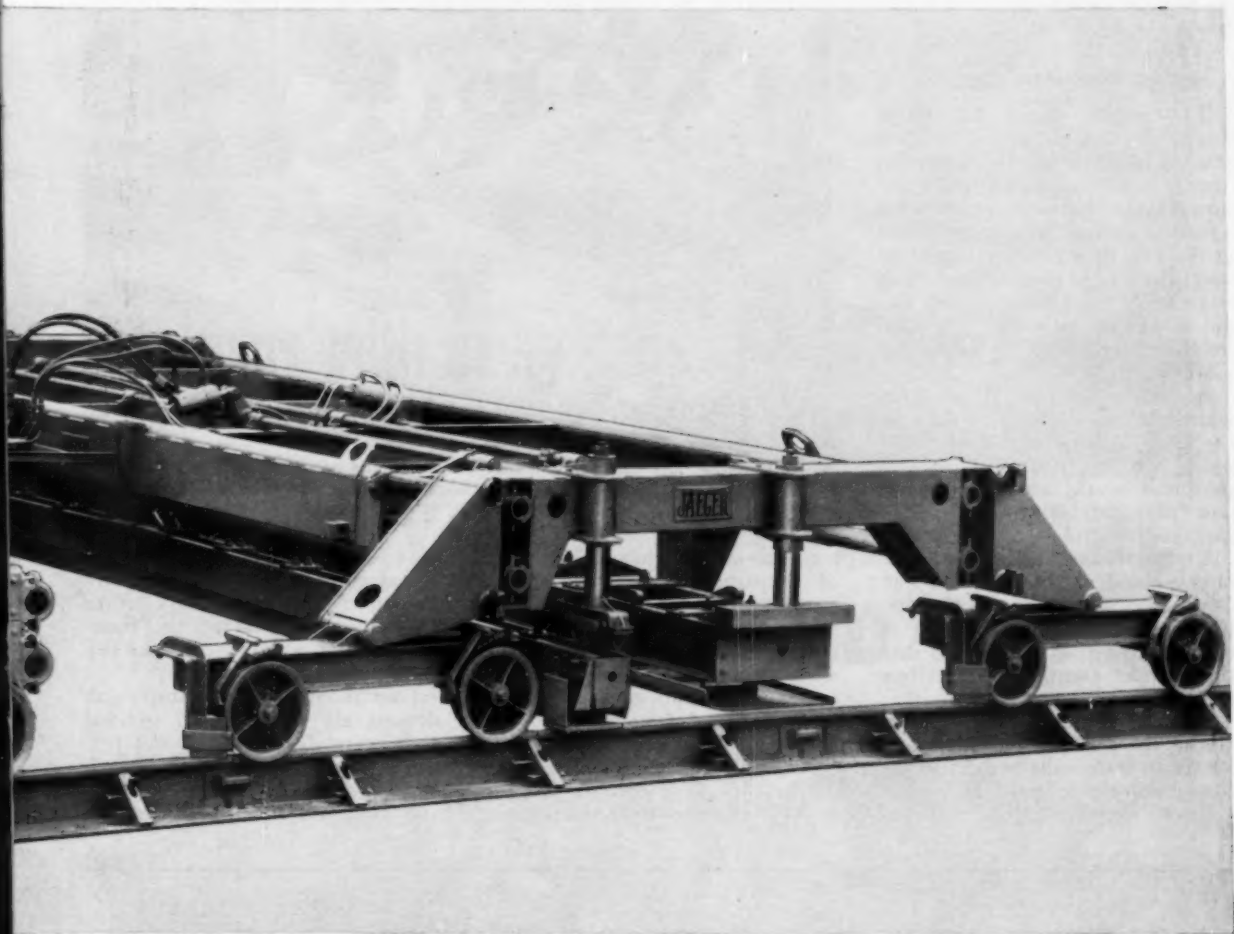
Gives 4-to-1 Correction: It has a narrow-bottom, short-stroke screed and a wide float pan. Both are suspended between bogie axles giving a 4-to-1 ratio of

correction (a 1/8" irregularity in the forms is reduced to 1/32" in the pavement).

Independent of Forms: The screed has hinged, spring-loaded end shoes so that it and the float are both independent of adjacent form level. The smoothness



TODAY'S PAVING TEAM (Spreading Screw, Strike-Off, 4 Screeds and a Float) NEEDS ONLY 2 OPERATORS



specified on Interstate and State highways and U. S. Engineers airport work is easily achieved. The floated surface is usually ready for burlap and cure.

"Kiss Finish" of the 6" bottom, 4" stroke screed eliminates high and low spots ahead of the float without bringing up grout or disturbing large aggregate at the surface. Three screed speeds are available at the touch of a lever.

Quick crown change screed, raised or flattened by turning one ratchet lever, is standard. You have your choice of parabolic or gable crown type.

No Separate Operator Needed: The machine is towed by any finishing machine, and controlled by the finishing machine operator. Screed drive, and screed and float lift, are hydraulically powered by an air-cooled engine and hydraulic system which are mounted on the deck of the finisher. Quick disconnecting, self-sealing hydraulic couplings, and single tow-pin, permit detaching machine in 2 minutes for moving or operating the finisher independently — a big advantage.

20' to 26' Quick Width Adjustability is provided by telescopic frame and screed and float extensions.

For Full Information see your Jaeger distributor or ask us for Catalog FF-9 giving detailed specifications on this modern cost-saving paving tool.

... for more details circle 373 on enclosed return postal card

ROADS AND STREETS, June, 1959



THE FINAL KISS TO A PERFECT PAVEMENT: 30" wide float pan, immediately behind suspended oscillating screed, completes the smoothest finish obtainable by precision paving methods. All corrections are first made by the screed. The kiss of the float pan, to the accurately metered surface, gives the perfect finishing touch to the slab.

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

Jaeger Machine Company of Canada, Ltd., St. Thomas, Ontario

ALL-HYDRAULIC FINISHERS • CONCRETE SCREW & SCREED SPREADERS
AGGREGATE SPREADERS • COMPRESSORS • PUMPS • MIXERS • TRUCK MIXERS

SEARED BRIDGE

(Continued from page 83)

The public works department finally decided to patch, and for this purpose used Super-Bondsit (by A. C. Horn). This is a white liquid latex emulsion, which when added to cement topping mixtures at the rate of 4 gal. per bag of cement in place of mixing water, aids in securing good bond as well as a patch having a sufficiently high ductility coefficient to withstand vibration.

A repair contract specification was prepared, allowing 45 days for the job. It stipulated that if the patch was not successful, the department would abandon the repair plans and draw up a new contract for bridge replacement.

Under the contract details the bridge could not be closed to traffic at any time during the 45 working days. Pouring and curing of the patching concrete had to continue under constant traffic vibration.

And due to the emergency nature of the work—impeding traffic and hazard to traffic—the penalty in the completion clause would be tripled.

Brown and Root, Inc., of Hous-



● The patching mix containing Super-Bondsit being screeded over a burned deck area, with workmen and supervisors inspecting the details.

ton, low-bid the job. Three days of preparation preceded actual pouring of the mix. The burned-over area, which was irregular, had to be squared off for good appearance. Loose spalled and burned concrete was chipped away. Clean-up however did not involve any deep cutting into the slab.

At 2 p.m. on the fourth day after preparatory work was started, the Super-Bondsit concrete was poured.

By 6 p.m. it was trowelled and completed. The actual patching work had taken just four hours. After 2½ days of dry-curing the resurfaced section was opened to the full expressway traffic load.

Four months later an inspection showed all patches well bonded and secure; feather edges still perfectly secure in spite of traffic vibration and of freeze-thaw cycles (temperatures down to 20 deg. F.).

B-r-r . . . Zero Outside, But Bridge Work Goes On

Concrete work goes on as usual. Well, almost, anyway. This picture is a reminder that since polyethylene film has become popular for enclosing work areas during the cold months, lost work days are mostly eliminated on a good many projects as a consequence.

Durethene polyethylene film, a

product of Koppers Company, Inc., was used to supplement the protection of this large canvas tent supplied by R. Laacke Company, of Milwaukee, Wis. It was used on an overpass bridge that was built on Illinois Highway No. 173, near the Wisconsin state line.

Advantages obtained from this

use of polyethylene film include low cost, ease of handling and transparency. This versatile plastic may be used, also, as a moisture vapor barrier, as a concrete-curing membrane (special white pigmentation has the approval of many state highway departments), and for covering equipment.

- Plastic side protection for structural pouring and finishing, a tent on top for the deck work—this kind of winter protection is putting bridge projects months ahead, as compared with former winter shut-downs.





...a 'plus' with every pass



DOES YOUR JOB REQUIRE A 26 YARD UNIT?



CURTISS-WRIGHT MODEL

226

CW-226 SELF-PROPELLED SCRAPER

Capacities: 26 cu. yds. struck, 36 cu. yds. heaped, 78,000 pound rated load

SALES • SERVICE • PARTS
at your
CURTISS-WRIGHT DISTRIBUTOR

Have you a big-yardage project coming up? . . . If you do, your job needs the self-propelled, 26 yd. struck, 36 yd. heaped CW-226 — the high production unit that carries more yards per load, more loads per hour . . . The CW-226 is a high production unit designed to handle large yardage projects, and give a bonus with every pass . . . Throughout the entire line of Curtiss-Wright 'plus-yardage' scrapers, unit construction, Roto-Gear steer, constant live winch and positive roll-out ejection make the difference . . . Make the difference pay off. These features make Curtiss-Wright the leader in the construction field today.

SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

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When Buying Construction Equipment —

Buy the Cheapest Priced?

Sometimes, perhaps. But you need to keep costs to really know. Here are ten factors, simply analyzed to help you think straight on the equipment purchases you make with hope of profit.

By R. L. Peurifoy

Professor of Construction Engineering,
Texas A & M College

On what basis should construction equipment be purchased? Should the initial cost only be considered, or should other factors be considered in making a selection? These are questions faced by persons who are responsible for the purchase of equipment. There should be some method by which they can be answered with a reasonable degree of dependability.

Some years ago an article appeared in a magazine, written by a man active in social life. He purchased a hat then proceeded to keep a record of the initial cost and the cost of tips which he paid during its life to redeem it from the hat check girls. When he ceased using the hat, he tallied his record and found that the initial cost was a small item when compared to the cost of owning and wearing the hat. Are you having this experience with some of your equipment because you took advantage of a "good buy" when you purchased it.

If the initial cost is the only factor considered, there is no justification for purchasing a power shovel and trucks to excavate and haul earth. Hand shovels and wheelbarrows are cheaper than power shovels and trucks. Likewise, hand axes cost less than chain saws.

It seems obvious that factors other than the initial cost should be considered. What are the factors and how can they be determined in advance of the purchase and use of equipment?

● *Unit Costs Give the Answer.* Equipment is purchased to perform work. Unit production cost is a measure of the economy at which the equipment has or will perform a unit of work. The most economical equipment is the one that will produce at the lowest cost per unit of work done during its entire life, and it is this equipment that should be purchased. The unit production cost can be determined for a given machine if cost and pro-

duction records have been kept during the time it was in use. Such information may serve as a guide in making future purchases. If unit production costs resulting from the use of equipment supplied by one manufacturer consistently exceed the unit production costs resulting from the use of similar equipment supplied by another manufacturer, this information will answer the question "whose equipment should be purchased?"

A utility company in Texas purchased a great many automobiles for use by its employees. Several makes of similar sizes were purchased. For each automobile a complete record of purchase and operating costs, together with the trade-in allowance, was kept. An analysis of the records revealed that there was a difference in the cost per mile of operation, depending on the make selected. As an official of the company stated, when the company purchases an automobile, it purchases transportation, and it buys that car which will give the lowest dependable cost per mile.

● *Example Proving Fallacy.* A government agency which uses substantial equipment for maintaining its highways purchased several new units recently. Prior to this purchase this type of equipment had been supplied by a manufacturer whose equipment had established an excellent record of dependable and economical performance. However, since equipment must be purchased on the basis of the lowest bids submitted, any unit offered which will satisfy the specifications must be purchased. The initial cost was the only factor considered. At a saving of a few dollars per unit competing equipment was purchased.

Soon after the new equipment was placed in operation, several common defects began to appear, which required that the equipment be taken out of service for repairs. Other defects appeared or the previous ones reappeared, which resulted in additional lost time and expense.

Since the equipment is used in isolated locations the amount of downtime waiting for parts has been substantial. Parts must be transported by air from

the nearest depot, which has further increased the cost. In order to reduce the delay in making repairs it was necessary to stock the more critical parts in the maintenance shops, which increased the amount of money tied up in inventory.

Although this equipment has been in use less than one year, the extra cost of downtime and repairs, when compared to the records established by the equipment previously purchased, has exceeded the saving in the purchase price.

It seems unfortunate that the purchasers of equipment for government agencies are required by statutes or ordinances to purchase equipment offered at the lowest price regardless of known differences in quality. Contractors are not so restricted, and can exercise judgment when making purchases.

● *What are the Factors?* What factors should be considered when purchasing construction equipment? The accompanying list may not be complete for all cases, but it should be sufficient for most:

1. Initial cost
2. Cost of maintenance and repairs
3. Cost of down time
4. Cost of fuel and lubrication
5. Length of economical life
6. Salvage value when disposed of
7. Proximity of parts for repairs
8. Dependability of performance
9. Ability to do work that will satisfy the specifications, in some instances
10. Types of jobs on which the equipment will be used

An analysis of each of these factors, as it applies to the equipment under consideration, will enable a purchaser to select that unit which is most economical and most suitable for the job it is expected to do. Some intelligent estimating will be needed.

Initial Cost. Since the equipment offered for sale will be at a specified price, this analysis will be simple.

Maintenance and Repair. The cost of maintenance and repairs should include the cost of all replacement parts plus the cost of labor required to replace the parts. If records have been kept on this cost for similar equipment currently or previously owned, especially for equipment that has been used under conditions similar to those under which the proposed equipment will be used, such information will serve as a guide in making this analysis.

If no records of previous performance are available, it will be necessary to seek it elsewhere or to try to make a reasonable assumption. While published information is available for certain kinds of equipment, based on experiences, such as that released by the Power Crane and Shovel Association for power shovels, draglines, and cranes, this information represents average experiences and will not necessarily apply to a given make machine.

For a given kind and size machine all makes will not have the same maintenance and repair cost experience. This is illustrated by an examination of the records of a contractor, as given in Table 1. The first two units were 2½ cu. yd. draglines, while

the latter two were 4-wheel tandem-drive motor graders, with 115 hp diesel engines.

While the costs of maintenance and repairs given above represents differences greater than usually occur between two makes of machines, the information is taken from actual cost records. In each case the saving in initial cost proved to be a very expensive investment.

Down Time. Down time is defined as the time a machine is out of service undergoing repairs. The cost to the owner during down time should include a reasonable charge for the equipment, such as the cost of ownership for that time, plus the cost of the equipment operator if he must be paid, and if his wages are not charged elsewhere.

In addition, if there is idle equipment, such as trucks waiting for repairs to be made on a power shovel, for which the costs of such idle equipment plus the wages to the drivers must be paid, these costs should be charged to the down time of the prime unit.

Thus, the cost of down time is more serious for a shovel loading trucks than for a dragline excavating a drainage ditch.

● *Fuel and Lubrication.* If it appears that the cost of fuel and lubrication will be essentially the same for two or more machines under consideration, this cost may be disregarded when making a comparative cost study. However, if there will be a difference in the cost, such as when a diesel-engine-powered machine is compared with a gasoline-engine-powered machine, the cost for each should be estimated, and should be considered in reaching a decision. Differences in fuel "mileage" efficiency is also known to exist between outwardly similar machines both using the same kind of fuel.

Length of Economical Life. The economical life of a unit of equipment is that period during which the equipment will produce at an economical cost per unit of output, considering all costs chargeable to the equipment up to that time. If the equipment is continued in use beyond this time, the cost of maintenance and repairs and downtime will increase sufficiently to result in an increase in the unit cost of production.

All equipment being considered for a job will not have the same economical life. An electric motor will have a longer life than a diesel engine, which in turn should have a longer life than a gasoline engine. A higher initial cost to obtain a longer life may be a good investment. Certainly, this factor should be considered.

Salvage Value When Disposed Of. Salvage value is the amount of money that can be recovered from equipment when it is disposed of. The recovery of this money results in a reduction in the total cost of depreciation of the equipment. Thus, if the cost and other factors for two machines are essentially the same, the one which will have the higher salvage value should be purchased.

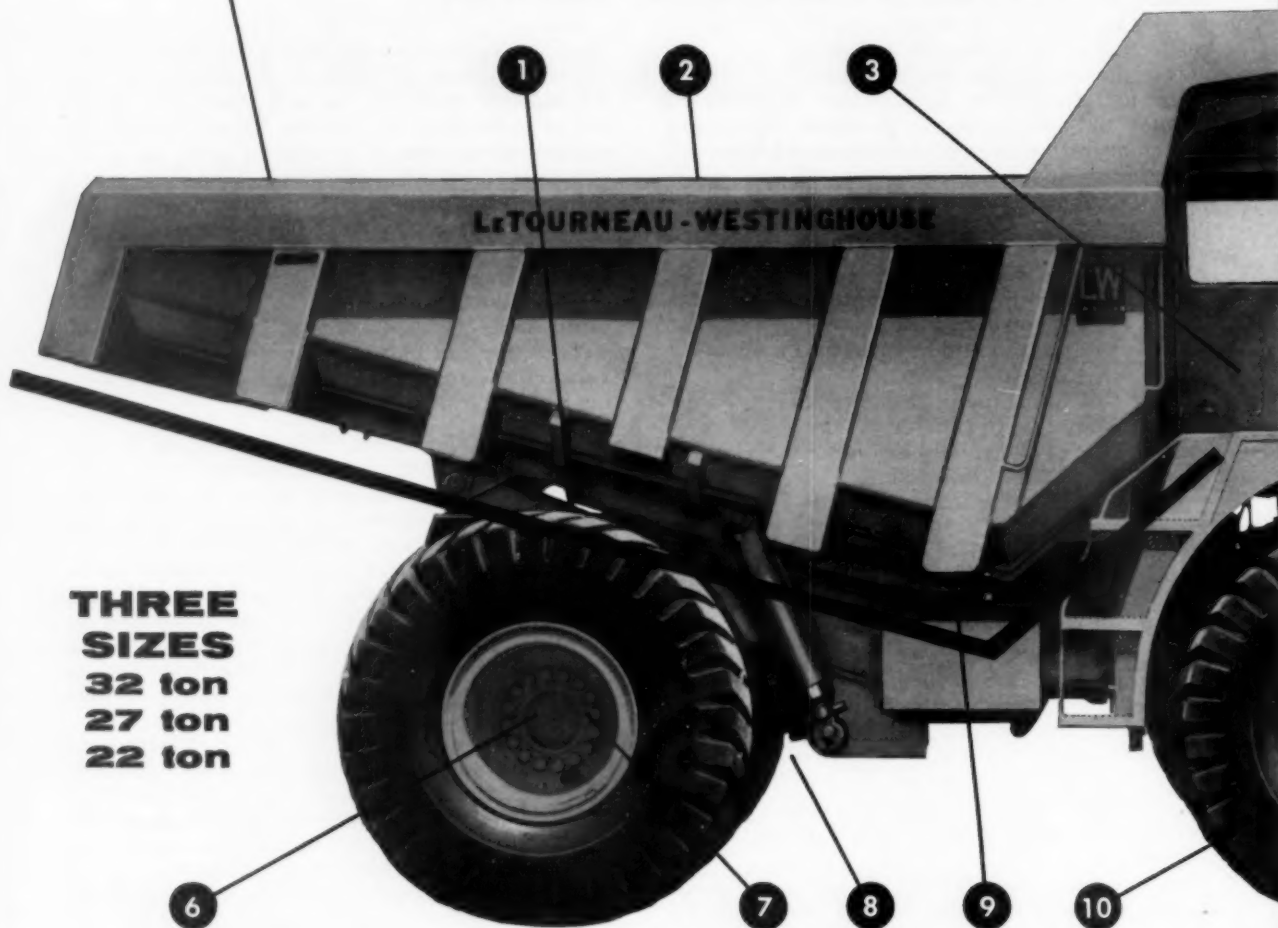
Proximity of Parts for Repairs. All machines are subject to mechanical failures, which require new parts. Since any time consumed while waiting for

(Continued on page 94)



PARADE OF PROGRESS

the first all-new off-road truck in a quarter-century .



**THREE
SIZES**
32 ton
27 ton
22 ton

Look at these important advanced Haulpak features!

1. "V"-shaped body — gives you bonus yardage within a short wheelbase. Loaded material quickly fills all corners for big low-void pay loads. "V" also provides a low center of gravity... gives Haulpak the stability needed for high-speed hauling over rough roads and steep grades.

2. Low loading height — (only 10'1" on the 32-ton size) and large top opening (14'5" x 11') — makes it easy for shovel operators to load Haulpak fast, without spillage.

3. Big, roomy cab — with canted windshield has many work-efficiency features.

4. Strong, protective canopy — covers cab completely.

5. Positive power steer — and sure-grip, auto-size steering wheel — for safe, easy handling. Steering system is located high behind bumper, well protected from damage.

6. Exclusive power-transfer differential — automatically transfers power to wheel on firmest footing for maximum traction. This same, patented LW differential has boosted production and profits for thousands of LW Tournapull® owners for more than 14 years... and now, for the first time, it is available on a truck.

7. Needs NO daily maintenance — Haulpak's bearings never need lubrication... they're moly-coated to resist abrasion, packed in grease, and sealed for life. The entire Haulpak lubrication check — needed only at 500-hour intervals — consists of just 4 easily-reached grease fittings.

8. Has no springs, rides on Hydrair® — Haulpak's exclusive air-hydraulic suspension system completely eliminates maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shocks. System compensates automatically for off-center loading and keeps unit riding level over humps and holes.

9. 100% rubber-mounted body — cushions loading shocks. Engine, transmission, radiator, and cab are also rubber-mounted to minimize vibration.

10. Four separate braking systems — two controlled by hand levers, two by floor pedal — for fast, safe, sure stops. System includes Torqmatic brake in the Haulpak transmission and big, disc-type air brakes on all wheels having 4 times the braking surface of conventional trucks.

11. "Power-Miser" fan — standard on all Haulpaks, requires only 10 hp to operate, compared with the 30 to 35 hp needed for conventional fans. Thermostatically controlled, fan shuts off automatically when engine heat falls below efficient operating temperature... permits engine to maintain correct temperature, releases more horsepower for tractive effort.

180° turn in area only 44 1/2' wide — with a wheelbase of only 130", Haulpak turns in far less space than units of similar capacity. This unusual maneuverability permits Haulpak to spot, swing around, back up, and dump without lost motion to delay hauling cycles.

Haulpak[®]



Hauls more tons per man-hour!

This LW Haulpak is all new from the wheels up. It is the result of more than 3 years of research and development by LeTourneau-Westinghouse engineers—pioneers of a long list of earthmoving and hauling equipment. Although brand new, Haulpak is a fully-proven truck. All three models have been put through rugged tests under the toughest working conditions for over 14 months—in mines, quarries, and on construction jobs. Its various parts and assemblies—some of them tested and proved by *millions of hours* on LW Tournapulls all over the world—are much stronger than those on ordinary haulers. With the all-new LW Haulpak truck you can be confident your truck maintenance, repair, and operating costs will drop to a new low... and your hauling tonnage will climb to new highs!

Check the job-tested Haulpak features listed here. Then visit your nearby LeTourneau-Westinghouse Distributor... let him give you detailed specifications on the new Haulpaks. Call on him soon!

*Trademark HP-2099-G-2

LW Parade of Progress continues:

The new Haulpak truck is the latest addition to an impressive line of new and improved earthmoving and hauling machines being unveiled by LeTourneau-Westinghouse Company. They're part of LW's continuing program of product development to give you highest production equipment at lowest ownership-operating cost.



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

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C TOURNAPULL®



**18-YD heaped
... 226 HP
... 33.5 MPH**

Get *complete* specifications from your LW Distributor. He can show you verified job histories of this machine . . . and, when you're ready, he'll arrange a working demonstration of a C 'Pull. He can help you, too, with advantageous trade-ins and financing. See him at your earliest opportunity!

...Standard of the Industry

Moves more pay-yards per hour . . . at lower cost than any other scraper in its class

For years, the C Tournapull has been acknowledged as "The Standard of the Industry" in fast, self-propelled scrapers. It offers you easier loading, faster hauling, quicker spreading . . . plus longer, trouble-free life . . . than any competitive scraper made.

Thousands of these high-production machines are in use around the world. Some of the reasons they've gained this tremendous acceptance in earthmoving are listed below. Review them, and you'll see why time-tested C 'Pull* is your *best* investment in medium-sized scrapers:

FULLPAK® SCRAPER DESIGN . . .

lower, wider, for better boiling action, fewer voids, bigger pay-loads per cycle.

CHOICE OF ENGINES . . .

choose either the 226-hp GM 6-71 or the 210-hp Cummins HBIS-600.

CHOICE OF TRANSMISSIONS . . .

the *only* scraper in its class that gives you a choice of step-gear transmission or a power-shift transmission teamed with low-pressure torque converter.

POWER-TRANSFER DIFFERENTIAL . . .

permits "C" to operate in slippery, muddy conditions that *stop* other scrapers.

ELECTRIC CONTROLS . . .

fast-acting, fingertip controls pinpoint accuracy, with the easiest-to-operate, easiest-to-maintain system of all.

INTERCHANGEABILITY . . .

exceeds any other make of scraper, with Rear-Dump, Bottom-Dump, and Flatbed haulers interchangeable, at low cost, behind the Tournapull prime-mover.

GREATER SAFETY . . .

with the biggest brakes in the industry, superior visibility, *instant* electric control and power steer that is not affected by the operation of any other controls.

MORE MANEUVERABILITY . . .

electric king-pin steer can U-turn C 'Pull in less than its own length, for fast, easy maneuvering in tight quarters, narrow haul roads.

LOW OPERATING COSTS . . .

you save money *every day* because of the features listed above, plus "C's" simple, rugged design, easy accessibility of component parts, minimum of lubrication points, and low requirements for fuel, cable, oil, and tires.

*Trademark CP-2141-DC-2



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

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Where quality is a habit

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(Continued from page 89)

the delivery of parts results in added costs, this time should be kept as small as practicable. If parts are available nearby, the time required to obtain them should be short, whereas if parts must be obtained from distant points, more time will be required for delivery. The latter will increase the cost of downtime.

For a job two pumps were being considered for purchase. The representative for each manufacturer was asked where parts could be obtained. One manufacturer had a distributor who stocked all parts within 100 miles of the job, while the other reported that his company was then negotiating for a parts distributor in that area, but had not yet completed the negotiations. If the latter pump were purchased parts might have to be shipped approximately 1,800 miles. This was a factor in selecting the first pump.

Dependability of Performance. Dependability is the ability to perform work, and keep on performing even under adverse conditions. A rubber-tired bulldozer may have certain advantages when compared to a crawler unit, but for many projects, especially under adverse conditions, the crawler unit will be more dependable than a rubber-tired unit. Electric motors are usually more dependable than internal combustion engines for operating the component units of an aggregate plant.

A gasoline-engine-driven water pump supplied all of the water required to wet the earth, wash the aggregate, and to mix and cure the concrete for a dam. Because of mechanical failures it operated less than 75 percent of the time, which resulted in frequent work stoppages at a cost in excess of \$100 per hour. This continued until the pump was replaced with a more dependable unit. Dependability is important, and should be considered.

Ability to Do Work that Satisfies Specifications. The specifications for a job may require the mixing of soil from several horizontal layers, neither of which is satisfactory, in order to produce a blend that is satisfactory. While scrapers could excavate the soil, they will not blend it. The probable solution is to use a power shovel whose dipper will make a full pass up the entire face. In some instances a 1-cu.-yd. shovel may have sufficient capacity to meet the production requirements, but it may be necessary to use a 2-cu.-yd. shovel to excavate the required depth of the face.

Specifications governing the size grading for aggregate for concrete and asphalt pavements sometimes make it necessary to use special equipment in the aggregate producing plant.

A contractor produced sand and gravel from a local pit for use in constructing the subbase for a runway for an army air force base. As the pit-run material failed to meet the specifications, the contractor was faced with a choice of three possible solutions: (1) screen the aggregate, with considerable waste, (2) install a crushing plant, or (3) process the material after it was placed on the runway. He found the last solution to be satisfactory and less expensive than either of the other two.

Type of Job on Which the Equipment Will be Used. While many kinds of equipment are sufficiently versatile that they may be used on several types of projects, such use may not be good economy in some instances. Operations on a project, especially a large one, may be most effectively and economically performed by special equipment instead of with standard equipment. When such conditions occur, the purchase of special equipment should be considered. The use of very large trucks illustrates this principle.

A contractor who owned several 2 cu. yd. draglines needed to purchase another machine. At the time he was considering the purchase he examined the site of a proposed river realignment project in New Mexico, for which he planned to submit a bid. The examination revealed that the work could be done with equipment which he then owned, but in order to be competitive he would need a 3 cu. yd. dragline. Since other work planned for the future also indicated the need for the larger machine, he purchased one.

●**Conclusion.** The purchase of construction equipment should not be handled in a haphazard manner. Too much money is tied up in it to permit frequent mistakes if a contractor is to remain solvent and competitive. Contractors who have given too little thought to the purchase of equipment have been heard to lament that even when they bid jobs down to bare estimated costs their competitors underbid them. Instead of the competitors going broke they continued to purchase new equipment when it was needed and met all their financial obligations on time. How was it possible to do this? An examination of the equipment purchasing practices of the competitors would help supply the answer.

Some contractors have staff members whose duties include constant and continuing studies of equipment, its cost, performance, and other factors. For such contractors the purchase of new equipment is not guess work. It requires time and costs money to obtain such information, but the investment in time and money can be a rewarding investment.

TABLE 1—ILLUSTRATING COST DIFFERENCES

Manufacturer (Dragline)	Initial cost	No. of hr used	Total cost M & R	Initial cost plus cost of M & R
A	\$65,786	12,210	\$39,495	\$105,281
B	67,442	12,210	12,808	80,250
(Motor Grader)				
C	12,285	14,624	8,248	20,533
D	12,993	14,624	3,554	16,547

LONG PRESTRESSED BOX GIRDERS For Bridge Replacement

Replacing a two-lane with a four-lane bridge without interruption of traffic is a project of Geo. W. Lathrop and Sons, general contractors, Toledo, Ohio.

To accomplish it, the contractor is using the longest prestressed concrete beams ever used in Ohio, and possibly the longest box beams of 42-in. depth ever used in the nation.

The bridge being constructed spans the Ottawa River at Suder Avenue in Lucas County just outside Toledo. Because Suder Avenue is a key link between a residential area and the city, county engineers desired to keep it open to traffic during construction. Replacement of the two-lane structure with a four-lane span is essential to meet increased traffic resulting from the completion of the Detroit-Toledo expressway.

First step in the project was to strengthen the abutments, already wide enough to accommodate a four-lane deck. Then a lane was constructed on each side of the present bridge, which is remaining open to traffic. When the lanes are completed, they will be opened to traffic, the original bridge lifted out, and the center of the bridge erected.

Eighteen precast beams, each 105 ft. long and weighing 43 tons, are being used in the project. Each is 42 in. deep, 36 in. wide, has a hollow core, and contains 64½ in. prestressed wire strands. The beams are being cast by Great Lakes Structural Concrete Products Company, Toledo, and transported to the site by special truck over a special route.

Using lifting hooks cast into the beams, which are later burned off, the beams are positioned by two

cranes, one at each end. When all are in place, the bridge will be post-tensioned, completely surfaced with asphalt concrete and pedestrian walks and guard rails added.

The original bridge will be cut up in three sections and stored by the county for future use at another site.

Equipment Operator School Begins Program

The National School for Heavy Equipment Training, of Mosinee, Wisconsin, began its first class this past spring. A class of 45 students studied and trained for operating and taking care of heavy equipment for road, airstrip, and other earth-moving projects. Most of the trainees were from the Midwest, but the school leaders expect the representation to broaden.

The school has solicited literature and films from manufacturers for use in the course. Those desiring more information on the school should write the National School for Heavy Equipment Training, P. O. Box 265, Mosinee, Wisconsin.

JOSEPH E. WILBUR, expressway coordinator, Michigan state highway department, has been named president of the Michigan Engineering Society.

- The longest prestressed concrete beams ever used in Ohio provide the base for a new bridge in Toledo, Ohio; Geo. W. Lathrop and Sons, are the contractors.



Big Push Begun on

500-Mile Wilderness Road in Saskatchewan



● Clearing right-of-way on Uranium City Road; part of Saskatchewan's string of equipment which will build the 500-mile highway.

Saskatchewan's dream of a "road to resources", penetrating to the very "top" of the Canadian province is becoming a reality. Construction of the 500-mile, La Ronge-Uranium City Road, which will open Saskatchewan's vast northcountry to a great new era of resource development, began in earnest in September.

A steady stream of men and equipment continues to pour into the provincial highways department's base camp, 20 miles north-

east of La Ronge at the Nemeiben River. Right-of-way clearing is accomplished at approximately a mile a day. A grading outfit follows closely behind the clearing crew. Some of the equipment now on the job includes scrapers, crawler tractors, motor and "pull" blade graders, construction trucks and many other pieces of equipment.

Road specifications call for a 100-ft. right-of-way, a top width of

22 to 24 ft. and a graveled "all-weather" surface.

Highways department construction started at the Nemeiben River Crossing. An access road from La Ronge to this point was pushed through by the provincial natural resources department's construction branch in 1957.

From the Nemeiben River, the road will run 40 miles north, northeast to the Churchill River, crossing at Otter Rapids. From there, it will push north past the Foster Lakes and along the east side of Cree Lake to the Fond du Lac River, and thence, west along the shore of Lake Athabasca to Uranium City. The approximate distance from Regina to Uranium City via the new road will be 925 miles.

"One of the biggest, toughest projects in the history of road building in Saskatchewan." That's how Ed Shearer, resident engineer for the provincial highways department, sees the building of the 500-mile La Ronge-Uranium City Road.

It's going to mean pouring millions of cubic yards of fill into

(Continued on page 99)

● Caterpillar D8 and grader, filling in grade on Lac la Ronge road between mile 15 and 16.



In all kinds of weather
... on all type jobs be they
construction, quarrying,
mining or logging ...
rugged built-with-NYGEN®

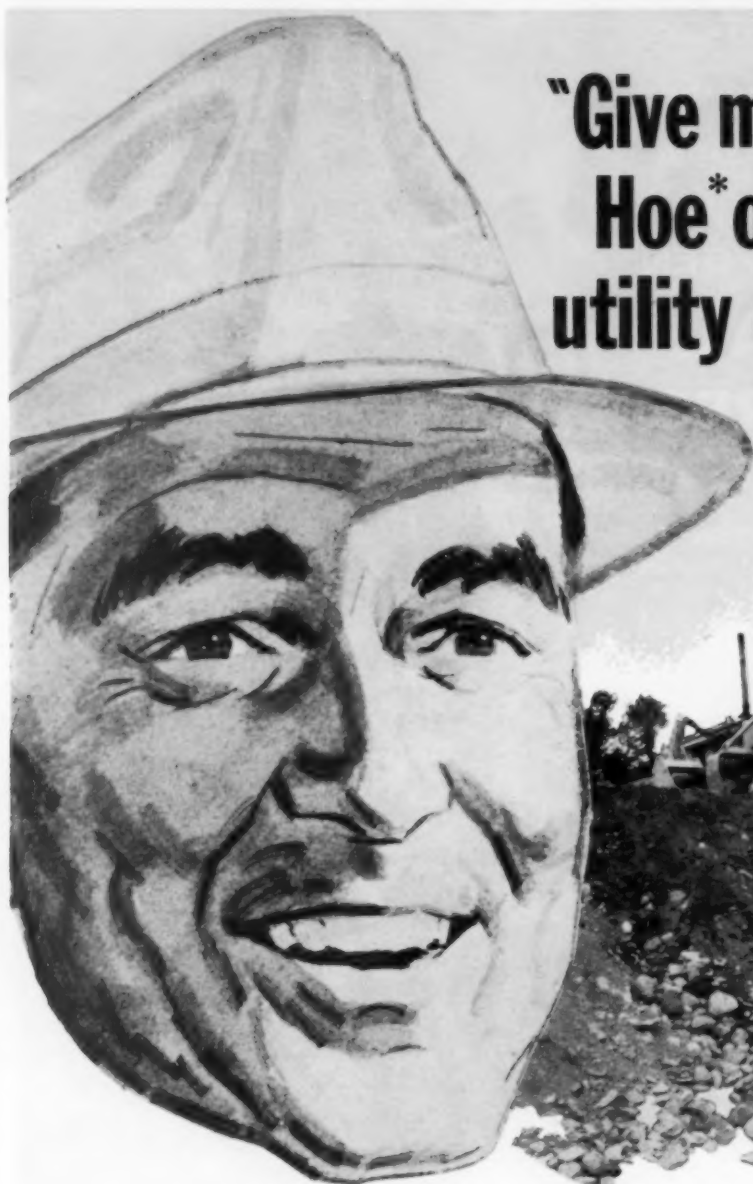
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deliver far more than your
money's worth in time-saving,
cost-saving performance
day in ... day out!



Specify GENERALS on your new equipment

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"Give me a Hyster-Hoe* on any utility digging job"



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These are the words of construction foremen working on all kinds of jobs for contractors, gas companies, public works departments and many others.

Give them the highly mobile Hyster® D4 Hydraulic Backhoe and you'll get high production trenching for power, gas and service lines; low cost excavating for septic, fuel and chemical tank pits, irrigation and tile ditches or catch basins.

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500 MILE ROAD

(Continued from page 96)

muskegs; hauling more millions yards of embankment material and gravel to build and finish the grade; blasting through walls of solid, pre-Cambrian rock and the building of hundreds of bridges, large and small.

Supply will be a major problem. Freight hauls, mostly by catswing, will have to be made in winter to spot supplies along the route the road builders will follow each succeeding summer. Perishables will have to be flown in to the advance road camps during summer construction.

Perma-frost, a phenomenon peculiar to the north, may be one of many construction problems faced by road crews.

Starting at the Nemeiben River Crossing, 20 miles northeast of La Ronge, the first 136 miles of road will pass through dense forest and heavy rock outcroppings. The next 69 miles will pass through an area of glaciation, characterized by northeast-southwest running ridges of rock and gravel, known as eskers.

The next 207 miles across the Athabasca sands to the Fond du Lac River will be relatively easy going. The last 100 miles, from the Fond du Lac River Crossing to Uranium City, will have to find a way through tortuous, near-mountainous terrain. This will be the costliest stretch of the whole road to build.

New Road Will Cut Across Northern Maine

A new 80-mile highway is planned across the northern Maine wilderness. Stretching between Ashland, Maine, and Daaquam, Quebec, about 75 miles southeast of Quebec City, it will provide a direct link in the existing Trans-Canada Highway between the capitals of Quebec and New Brunswick provinces. The present route loops 150 miles around the northern tip of Maine.

The estimated cost of the Ashland-Daaquam highway would be some \$8,000,000. The Maine state highway committee recently authorized the highway commission to start an engineering survey and prepare plans for the construction,



● Construction camp at Waden Bay, where work is progressing on Uranium City Road.

which would run through a heavily wooded primitive area of lakes and rivers.

Heavy tourist traffic from cities in Quebec province (state) and New Brunswick is anticipated in summer. Also, the new route is certain to be used for logging operations in winter. The road also would provide an outlet for Aroostook County, Maine, farmers to the St. Lawrence Seaway, particularly for the shipment of the annual potato crop.

RELATION BETWEEN VEHICLE CHARACTERISTICS AND HIGHWAY DESIGN: A Symposium. Bulletin 195, Highway Research Board, 2101 Constitution, Washington, D. C. Price, \$1.00.

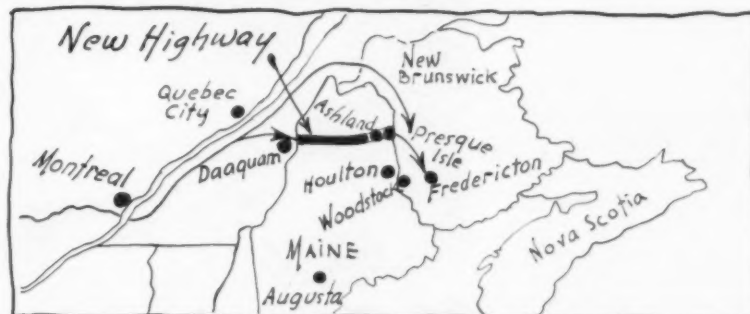
This bulletin comprises seven papers presented at the Board's 37th annual meeting on topics of mutual

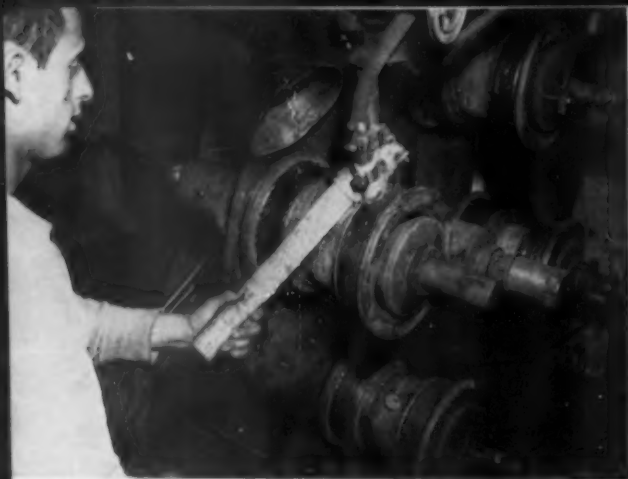
interest to automobile manufacturers and highway engineers. The papers discuss such matters as driver eye height, in relation to crest sight distance and no passing visibility; the size of vehicles in relation to driveway profile design and parking space.

PHOTOGAMMETRY — DEVELOPMENTS AND APPLICATIONS: 1958; Bulletin 199. Highway Research Board, 2101 Constitution Avenue, Washington, D.C.

This 82-page bulletin contains the report of the HRB Committee on Photogrammetry and Aerial Surveys, together with seven papers and their discussions on these subjects as presented at the 37th Annual Meeting of the Highway Research Board. Price, \$2.00, from the Board at 2101 Constitution Ave., Washington, D.C.

- Proposed new highway eastward from the Quebec-Maine border would eliminate extra miles for Quebecers visiting the Maritimes.





● Four rollers are being hardfaced simultaneously with the multiple spindle used on Hales' automatic welders.

HALES' TRACTOR HOSPITAL

Where Worn Undercarriages Go For Renewal

Contractors often find it's cheaper to let this enterprising welding and machine shop renovate their equipment, than to do it themselves.

Set up a well-equipped welding and machining operation. Specialize in the repair and rebuilding of track rollers, idlers, rails and shoes. Work with your customers; let them know that you really want to help them save money.

This formula has built up a flourishing business for the W. M. Hales Company, of Danville, Illinois, whose shop is a center of tractor undercarriage repair for eastern Illinois and western Indiana.

The Hales Company was established in 1916 as a supplier and re-

builder of mining equipment. In 1951 the decision was made to take in construction equipment also, and today 60 percent of the business is with contractors and 40 percent with strip mining operators. Most of the construction business is done with earthmovers, including many prominent midwest firms. Hales' crew of 28 mechanics and welders and two machine operators can take care of any tractor, scraper or shovel repairs. Power-take-off, cable control, transmission and even complete engine overhaul are done

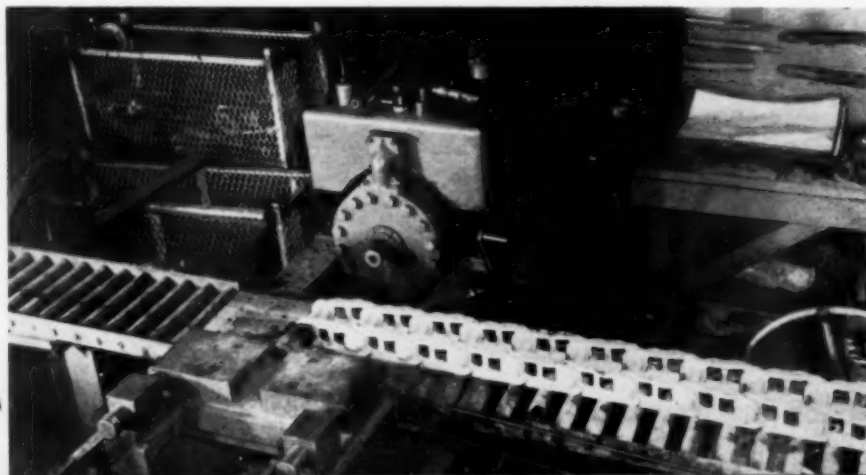
when necessary. But 90 percent of the company's work for contractors is with tractor track assemblies.

One benefit of this specialization is the streamlined work-flow which can be effected. With an average of 8 to 12 jobs in the shop at one time, and sometimes as many as 20, Hales squeezes efficiency out of every operation. Here is the journey which a set of rollers takes through a rebuilding job:

(1) Every incoming job is assigned a number, with a small metal tag bearing this number attached to each unit. A work sheet listing all instructions is made up, with three copies to the shop superintendent, one to the purchasing agent and one to the stockroom.

(2) The rollers are disassembled on an 18-ton hydraulic roller press

● A track in position for pin and bushing removal by the Lempeo press.



designed and built by Hales' shop superintendent, Ed Bernardi. This unit, a one-man operation, has a 6-in. diameter piston with a 1¾-in. heat treated piston rod and 16-in. travel. It will accommodate any roller from 5 to 14 in. diameter. The 16-ft. long table will hold a full set of Caterpillar D9 rollers.

A lift truck brings the rollers up to the table where they are rolled off in a line. The operator goes down the table, loosening and removing bolts. He then takes his place at the press, inserts a roller, then turns it around. When finished, he rolls the roller down a 2-rail track to the floor.

Working on the floor in the usual fashion it takes two men about 15 minutes to disassemble a roller. But with the firm's press, Hales says that one man does the job in 3½ minutes. Using the press, the shopmen disassemble 80 to 90 rollers a day.

(3) The roller shells are steam cleaned.

(4) An inspector checks all parts against the work sheet. The purchasing agent also has been checking the job sheet against inventory cards, ordering parts not in stock. The worker on each subsequent step consults the job instructions; if a part is needed he goes to the parts clerk who gives it to him, and



● Men handle removal of track pins and bushings on the Lempeo press.

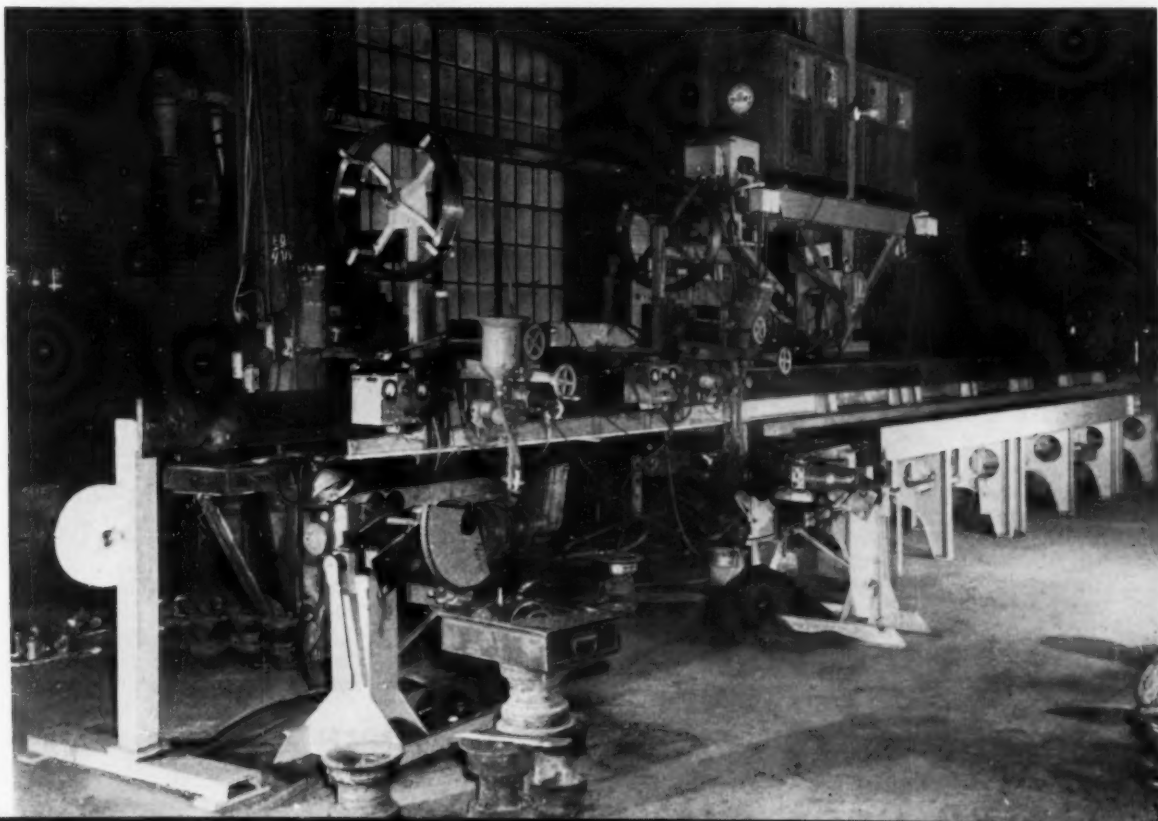
checks it off against the job number.

(5) The rollers are sent to the welders. This phase of the work will be discussed later in more detail.

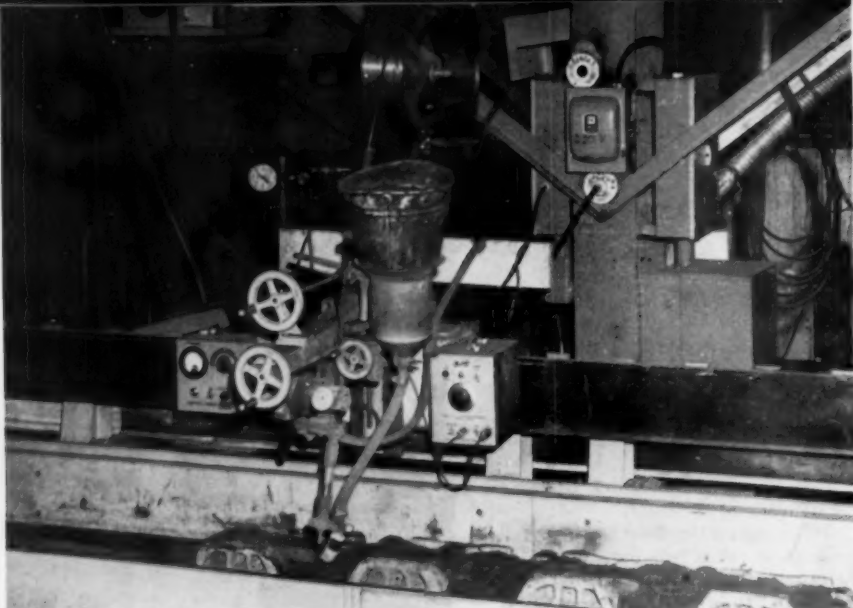
(6) After build-up and hard-

facing, the rollers are brought to a Gisholt 4L 25-hp lathe where each is machined to take off any excess hard metal and to impart a finished, new-part appearance. This "luxury" service is received with much gratification by Hales' customers.

● The two rolls of Stoddy welding rod mark the positions of the automatic welders—whose multiple spindle are removed, in this instance. Stretching out to right is the rail welding table.



- A Berkley automatic welder moving along a length of tractor rail.



- Operator adjusting amperage and flow of flux of welder over track table.



(7) The rollers go to the machine shop where the bore diameters, which shrink about 6/1000 in. because of the welding heat, are re-bored to exact size.

(8) Also in the machine shop, screw holes are re-tapped to facilitate accurate assembly of the roller.

(9) Reassembly. On Hales' roller press a set of twelve Cat B8 rollers can be reassembled in 2 hours 15 min. by one man. In time studies, a roller has been put together in 7½ min.

(10) The rollers are re-painted in their original color, then readied for shipment.

Track rails are first trimmed be-

tween the joints, then placed on a Lempco press where pins and bushings are removed and new ones installed. If welding is needed, the rail is brought to the rail welding table where a track-mounted welder brings the wearing surface up to standard height.

● *Hardfacing Tricks.* With most of Hales' work consisting of rebuilding worn surfaces, the hardfacing operation is the hub of the shop activity. The welding load is borne by two Berkley automatic welders for rollers and idlers, one of which doubles as the track-mounted unit mentioned above.

Bernardi's inventiveness figured again in the fabrication of a device

which has upped Hales' roller welding production 20 percent. This is a multiple spindle which will hold from four to six rollers at a time. By rotating during welding—surfacing one side of a roller and then indexing to the next roller—warping and distortion are held to a minimum.

The roller and idler positioner as a main frame of 1,500 lb. capacity and a manual tilt of up to 135 deg. The spindles mounted as the outer periphery of the turntable are tooled to hold rollers, and this tooling is flexible enough to cover the complete range of roller sizes. A variable speed drive operates the rollers and the turntable of the positioner. Removal of the turntable permits the mounting and welding of front idlers on the heavy 2-in. center spindle.

Hales welds around the clock on three shifts, with an operator on each of the two automatics. For rollers the company uses 100-lb. coils of Stooddy 104 wire for build-up and 105 for top hardsurfacing, with an average 24-hour consumption of 250 lb. At 300 to 325 amp., the surface feed is set at 22 to 26 in. per minute of travel. For rails the rate is 30 in. per minute at 400 to 450 amp.

Hales uses about 2¼ tons of flux per month. This rate is kept low through a Bernardi-designed flux reclaimer which brings used flux back to the welder again and again. The flux is screened at the top of the device. Usable material drops directly into a hopper; the rest is fed down a metal chute to a can-

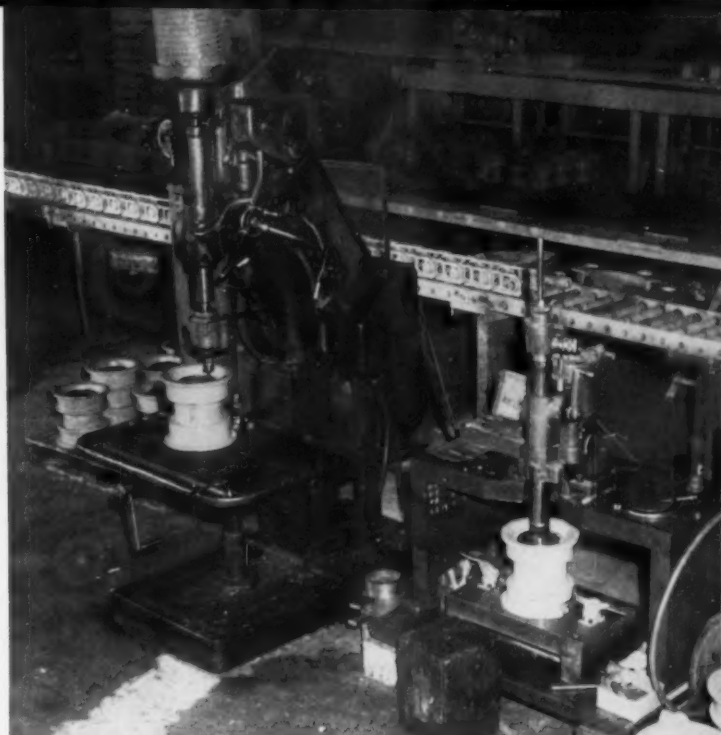


● Starting with a Van Norman boring bar, shop superintendent Ed Bernardi built this device for the re-boring of rollers to their proper diameter.

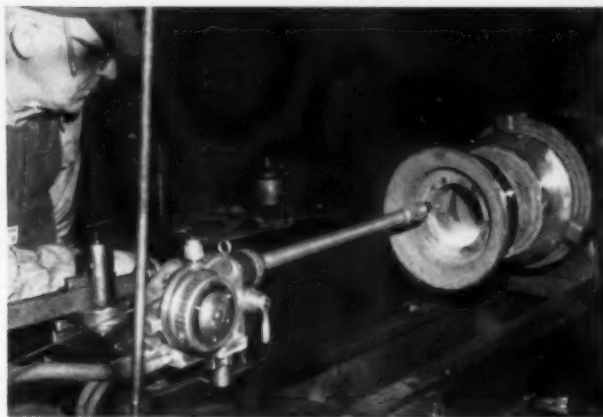


● Screw holes are re-tapped to aid in the quick and sure re-assembly of the rollers.

● One of the steps in refinishing track rollers.



● Two steps in renovation of a tractor roller. At left, screw holes are being retapped. At right, one of shop superintendent Bernardi's creations re-bores a roller to exact diameter.



Hales' Highly Mechanized Refinishing

was belt roller. Six 100-lb.-pull, double-bar magnets, placed around the end piece of the roller, draw metal waste around and into a waste box underneath. The retainable flux material, cast off the end of the belt into a container, is taken to a small crusher where it is reduced to usable size.

Besides machine tools for the rollers, the 70 x 100-ft. machine shop contains a supply of stock

steel and a well-equipped line of tooling equipment — lathes, radial drill, cut-off saw, gear cutters, milling and metallizing machines and three electric hoists.

With a considerable inventory in rollers, rails, idlers, sprockets, track bolts and nuts, Hales is able to provide for 85 to 90 percent of its own parts needs. The stockroom also contains shelf space for transmission parts, small parts and mis-

cellaneous nuts and bolts. A Hyster lift truck moves track rails and carries other parts on skids.

The company gets its parts from local Caterpillar, Allis-Chalmers and International dealers and from WesTrack Company, a California parts supplier. Hales also operates a distributorship, handling A-C, Cat, International, Euclid and Le-

(Continued on page 108)



*600 hp Michigan replaces tandem-pushers
on Hugh Steele Inc. highway job*

Earns \$126 extra

"Earning their keep!?! Why, in a year, I could run them into the middle of the Chattahoochee River, and still walk away with a profit!"

Hugh Steele is talking about three rubber-tired Michigan Dozers that are making their mark in big, bold dollar signs all around his 18.1 mile highway contract near Ashburn, Georgia.

Biggest profit producer is in the cut. It's a 600 hp Michigan Model 480! This big rig started out in demonstration against two 190-hp crawlers push-loading in tandem. The results were so one-sided Mr. Steele wouldn't let Atlanta distributor Stith Equipment Co.

take the Michigan off his job.

Scales, stop watch tell the story: 14 more loads per hour

With scales and stop watches, this production story was recorded:

Material	Model 480 Sandy clay (3000 lbs/yd)	Tandem Crawlers Sandy clay (3000 lbs/yd)
Scraper capacity (each of 12 machines)	25 yds heaped	25 yds heaped
Average load time	30 seconds	44 seconds
Pusher cycle time	60 seconds	84 seconds
Average payload, scale weighed	60,000 lbs	48,600 lbs
Average pay yds	20.0	16.2
Scraper loads per 50-min hr.	50.0	35.7
Scraper output per 50-min hr.	1,000.0 yds	578.3 yds

In terms of cold cash, these figures mean simply that the Michigan *earns more dollars per hour*. A lot more! In 30c dirt, its *extra earnings* average \$126 per hour over tandem pushers, according to Mr. Steele.

**Faster pushing nets
bigger pay loads**

Watch a few push-loading cycles and you'll see why. The Model 480 has half again as much power as the two crawler-pushers *combined*. It backs up faster than crawlers, and being one machine instead of two, naturally positions faster (24 seconds faster, on the



Biggest Michigan of all, this 600 hp Model 480, does more work than two big crawlers combined.



Steele's two 262 hp Model 280 Michigans spread and compact 20,000 yds of fill a day. In "spare" time, units also handle such scattered odd jobs as dressing stockpiles (below), towing disabled vehicles, backfilling around culverts.

per hour

average, on this job). It pushes faster (at speeds up to 5 mph), which both reduces load time and keeps the dirt more "alive." Result: higher, tighter, bigger loads—and more of them.

Other Michigans save time on fill-compaction assignment

Just as the big Model 480 is producing profits in the cut, so too are two other Michigan Dozers saving money for Owner Steele on the fill. These units are both 262 hp Model 280's. They are spreading fill and compacting . . . achieving specified 95% Proctor in

two to three high-speed (7½ mph) passes.

Speed scattered odd jobs

And that's not all. Go-anywhere 28 mph mobility allows the Michigans to sneak away from main assignments to tackle emergency jobs. Towing disabled vehicles, for example. Back-filling around culverts. Building up low spots in haul roads.

These are just a few of the odd jobs. But the real advantage of Michigan Dozers, Mr. Steele says, is their ability to outperform crawlers on many production

jobs too. And do it day after day, with dependability equal to that of Michigan Tractor Shovels. There are four size Dozers to choose from: 162, 262, 375, and 600 hp. Your Michigan Distributor will be glad to show you one in action so you can judge its advantages for yourself.

Michigan is the registered trademark of
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Construction Machinery Division

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St. Thomas, Ontario

Operator training a problem?



LOOK HOW MICHIGAN SCRAPERS LICKED IT FOR THIS N. J. CONTRACTOR

Take a look at the operators on Sallcon Incorporated's scrapers. You're liable to see a new man every week or two. The reason is the high cost of labor. Handling mostly small contracts, this Somerville (New Jersey) firm frequently finds it most economical to lay off men between jobs—then rehire when they go onto a new site. "In half a month's

time," explains Jim Seibert, company president, "we may be forced to use two or more different operators per machine."



High travel speeds reduce waste time on jobs like this 48 acre, 150 home development in Middlesex County, N. J.

Clutching—none

"Under these conditions, it's naturally important to us that scrapers be as easy to operate and as easy to take care of as possible," continues Mr. Seibert. "We looked at them all . . . and decided on 10½ yd Model 110 Michigans. *Their power steer, power shift, and torque converters take the effort out of moving dirt!* New operators become pretty proficient after only a few cycles. Nobody wears away clutches, because there is no foot clutch. Gear selection is no longer critical; torque converter drive automatically balances speed and load.

"Michigan's hydraulic system is simple to master, also. The power train is easy to get at. What's more, based on our experience of last season, I feel Michigan 110's will prove extremely dependable over their entire working life."

Output—160 pay yds hourly on 500 ft cycles

Production has been very good! On a typical housing development job, cutting roadways, each Michigan averaged 20 loads per 50-minute hour. One-way hauls were approximately 250 ft. Loading, with 85 hp pusher, took 40 to 45 seconds. Payloads in clay averaged 8 bank yards.



Positive ejection spreads load in seconds. Michigan controls are all-hydraulic; are actuated by easy-to-reach short-throw levers.

Power steer, no-clutch power shift-torque converter drive, good visibility help ease operator training.



A typical Michigan payload: 8 bank yards of clay. Pusher is an 85 hp crawler. Load time: under 45 seconds.

On tougher jobs—cutting railroad sidings and excavating industrial basements, for example—the 162 hp Michigans frequently are teamed with a 140 hp pusher (which cuts load time to 25 to 30 seconds).

Self-loads satisfactorily

Occasionally they work alone, self-loading close to their 8 yd struck capacity.

In tight-quarter assignments—like grading between houses and building driveways—their power steer and short turn radius speed cycles.

The machines drive everywhere under their own power. Speeds up to 31½ mph.

Check Michigan Scraper advantages on your job

Mobility, versatility, output—and *ease of operation like this*—we think, can help you too. For proof, we'd like to *show* you, first-hand, what Michigan Scrapers can do on the only job you *really* care about—*your own!* Let us bring a demonstrator to your work area. Let your own operators run it. Measure output. Compare performance. Then pick the size you need! Three models available, 10½, 19, 29 yds heaped.

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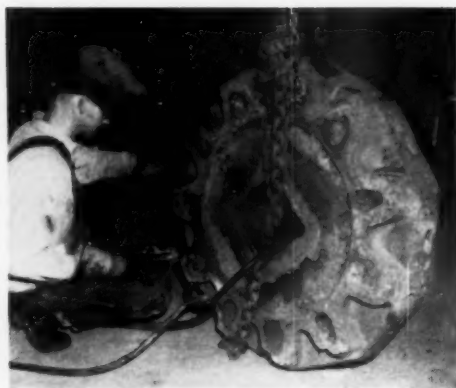
In Canada: Canadian Clark, Ltd., St. Thomas, Ontario

. . . for more details circle 303 on enclosed return postal card



- Another Hales innovation, this flux reclaimer screens out retainable flux immediately, passes rest down to a canvas belt whose bar magnets draw metal waste around into box underneath, with reusable material thrown off into a container for crushing and re-screening.

- A worker readying an idler for cleaning and hardfacing.



- The welder prepares to index multiple spindle to another roller setting.

(Continued from page 103)
Touneau-Westinghouse parts, primarily undercarriage but also cutting edges, grader blades and other

items such as Federal Mogul and BCA bearings, B&B wire rope, Wicks oil filters.

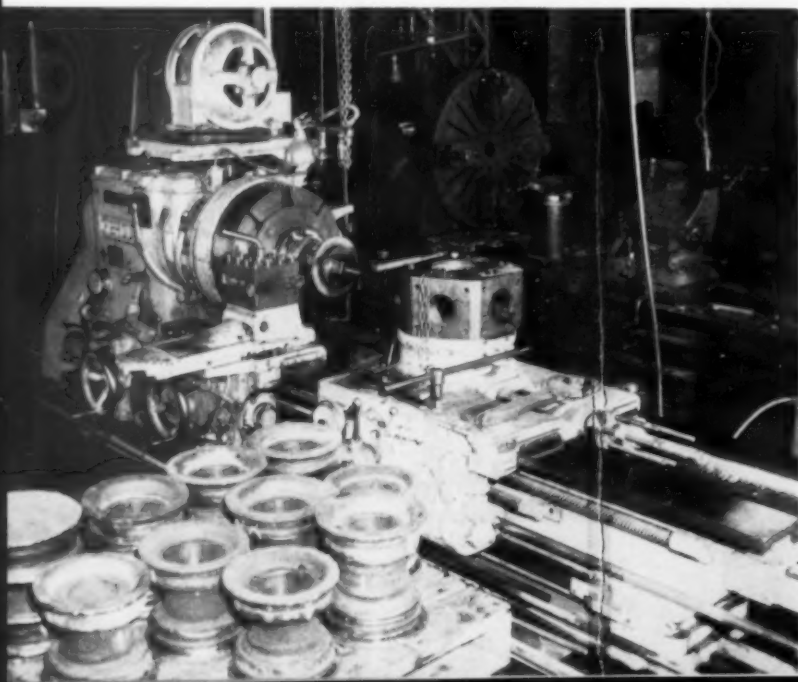
The Hales' firm sells itself ag-

gressively. Three salesmen are constantly on the road visiting jobs. They look at a set of rollers and tell the operator when repairs will be needed—"and we'll have everything ready for the job when they come in."

But the firm's reputation is built largely on the conviction with which it says "we want to help you maintain your equipment and save you money." Contractors are cautioned not to let parts wear down to the nub before repairs, and the company hands out gauges to get operators in the habit of measuring rollers, shoes, etc., periodically. It advises on proper repair policies; for example, it is often wiser to choose new parts rather than rebuild old parts for small tractors because the parts are not as expensive as on large equipment.

(Continued on page 110)

- A newly hardfaced roller is being machine-finished on this Gisholt lathe while another group waits its turn in the foreground.



AGC at Albany

Sponsors Pre-Season Construction Meetings

Dinner meetings held in the state highway districts to help contractor's men better understand the specifications and discuss mutual problems.

Roads and Streets Staff Notes

The saying is that when contractors and engineers break bread together, and swap ideas on problems, the problems tend to be less formidable and there is a better understanding all around.

This philosophy was put into action during April in New York state in a series of one-evening meetings in the various state highway district. Sponsored by the Associated General Contractors' New York State chapter, the meetings were for the purpose of airing problems existing between the contractors and the department, and of clarifying the state's position on certain specifications and procedures.

Just preceding the meetings the state's top highway construction supervisory staff met for two days at Albany. At these briefing sessions, with top administrators sitting in, they thrashed out questions, listed problems to be taken up with the contractors, and brushed up on their specifications and procedures.

Then on April 7, the first of the AGC-sponsored district meetings was held at Albany. On hand for AGC were Louis G. Blackhall, managing director, and Theodore Zoli, district director, and Homer Peters, the chapter's legal counsel. Representing the state department of public works were Henry Ten

Hagen, chief engineer; Bernard A. Lefevre, deputy chief engineer; and George L. Nickerson, district engineer at Albany. Henry A. Cohen was present for the state bureau of contracts, and John Tiesler, state chief budget examiner. The Bureau of Public Roads division engineer for New York, E. F. Koch, and John Swanson, regional engineer, were present. And there were some fifty representatives of contracting located or doing work in the Albany area.

The agenda consisted of a dozen problems or topics suggested by the contractors. The conference went down the list during the evening. The following notes cover selected topics.

● *Monthly and final estimates and supplemental agreements.* Contractors on New York highway work, as in other states, have sought speedier handling of payments. A representative of the state budget bureau which handles such payments centered his remarks on the supplemental agreements, where slow-payment complaints have come up. He promised more people will work on this, assuring speedier processing.

Contractors are often themselves to blame for not sending in promptly the information needed, said district engineer Nickerson.

Supplemental agreements, he noted, are based on decisions on the job and require discussion between the contractor's superintendent and the engineer. If this discussion doesn't bring an agreement on the price desired, then the field engineer must get a district office decision, all of which takes time. A price analysis must be attached to any request for a supplemental agreement in this state where a negotiated unit price is involved.

Failure of contractors or their subcontractors to comply with contract requirements is another source of delay, Nickerson told the gathering. Details such as submission of proper labor lists, material samples, etc., must be met, and fabricators and subs must cooperate by sending in data or samples required of them.

Payment on monthly estimates are often delayed, said Nickerson, because the quantities haven't been set up for increases involved. One contractor representative suggested that the contractors have a check list of items involved in submitting estimates on various kinds of work. Such a list would help in completeness of reporting and in accomplishing full compliance.

Mr. Lefevre reported that the highway staff has agreed to check the status of monthly estimates and the "final book" frequently, to insure least delays in getting the contractors their money. A step-up in field inspection this year is part of the state's effort to speed payments.

● *Right-of-way clearance problems.* Contractors were given the "good news" that the state will handle right-of-way details farther ahead. The state attorney general's department has promised to cooperate on the legal handling. Removal of houses and other obstacles from land in the path of construction has sometimes held up the contractor's work in New York as in other states. The aim now will be to have all such obstacles out of the way by the time the contractor moves in.

The principal problem for some contractors here, according to one spokesman, isn't the condemned structures on the right-of-way, but the handling of utility relocation and other matters pertaining to property owners alongside the job. Water lines, septic tank connections, etc., cause farmers concern and make trouble for the contractor. The right-of-way agents, it was claimed, have not always presented

the true picture of these problems in the past. On the other hand, the farmer or home owner himself hasn't always revealed the existence of such facilities until the contractor is about to move in.

● *Recording minor changes in the contract.* The importance of keeping a diary of the job was brought out in connection with this question. It was noted that the more experienced contractors wait for an order to perform any work involving a contract change, however small.

On a related question, how to give proper notification of work not considered part of the contract, the contractors precipitated quite a discussion. In the past one problem has been the field engineer's inability to make decisions beyond a certain point, without contacting his district office for advice or at least moral support. Mr. Nickerson in commenting on this familiar problem observed that neither the state nor the contractor can, as a good management policy, delegate more than so much authority in the field.

The contractor doesn't give his field representatives unlimited authority, said Nickerson, and neither can the state do so with theirs. A little delay to the contractor here and there is a necessary part of the business of arriving at decisions affecting job changes and payment.

● *"As Ordered by the Engineer."* This clause in the New York speci-

fications has been criticized by some contractors. Mr. Lefevre stood up for its continuance in the specifications, saying that the phrase could not be banned completely. No matter how good the specifications, there must be someone to render judgment on many small and larger points of details as the work progresses. There must be a succession of little end-results, he said, or else the contractor will have to carry the work until the job is accepted. New York engineers feel that the phrase safeguards both parties, as long as it is not abused.

On a related subject—of job progress—Mr. Lefevre said that a little delay won't hurt a contractor who is up on his schedule. But how can progress reports be judged if the contractor has no real schedule, or a fake one? The state department expects to ask contractors in writing why they are not on schedule.

● *Handling traffic around or through construction* (Specification item 76) took up considerable time. One contractor requested that all districts handle this phase in a uniform manner. State spokesmen reported that the requirements for traffic control are presently being revised, and that more thorough and careful attention to traffic protection will be expected. Suggestion: drive the detour or emergency traffic lanes on a dark, rainy night to judge the adequacy of signs, barricades, flares and other devices.

The money set up in the engi-

neer's estimate for traffic handling has sometimes been inadequate, was another contractor's complaint. The leaders concluded by warning that contractors will have to give much more consideration to handling traffic and being thoughtful of neighbors around their projects. "Treat your abutting property owner as if he were your mother," counseled Mr. Lefevre. "Don't thoughtlessly block his driveway."

● *Permits for moving equipment.* This question centered in the possibility of special permits to haul overloads of dump truck material. The state has tried in the past to work out a formula for granting permission to hauler where modern paved routes are involved, but this has given certain firms unfair competitive advantage, and the policy has been discontinued.

It was noted that material trucking is a very large element of highway construction cost, and that this subject is one of great importance. The state doesn't however have sufficient continuous mileage of high-type, heavy-duty pavement on its system to warrant letting down the bars even on special occasions.

HALES HOSPITAL

(Continued from page 108)

In going out after the contractor's repair and rebuilding business, Hales smooths the way into the shop by a variety of repair arrangements.

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In the new 27 cu. yd. 495 Paywagon®, big earning advantages start with the new International DT-817 diesel engine. Forty-ton payloads highball upgrade or over rough and soft spots faster than ever behind the locomotive-like wallop of 375 turbocharged hp—more power per struck yard than any comparable wagon! Next, the “495” Paywagon’s exclusive power-opened clamshell doors give positive dumping control—and retract parallel with hopper sides—“clean as a whistle” from wiper plate action! Pull-away clearance, to straddle 60”-high windrows, eliminates dumping delay! Too, the 495 Paywagon has new full 90° turning in either direction; new road-hugging design to gain top mph safely, out and back, at speeds up to 32.0 mph. Plus exclusive extra operator comfort and control features that reward you with extra production!

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In the new 24 cu. yd. 295 Payscraper—you get the same big-capacity, high-torque engine that powers the 495’s: the 375 hp DT-817! You get haul speeds up to 29.1 mph—matched with new automotive comfort and control features, that include a 16-adjustment seat. And the scraper unit of the 2-axle 295 is the same heap-loading, tapered bowl, wide-cut scraper featured in the 495 Payscraper!

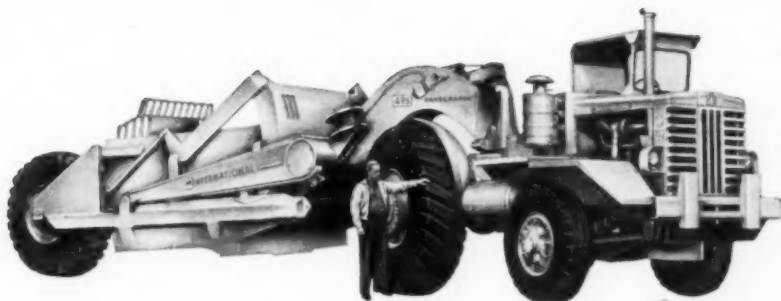
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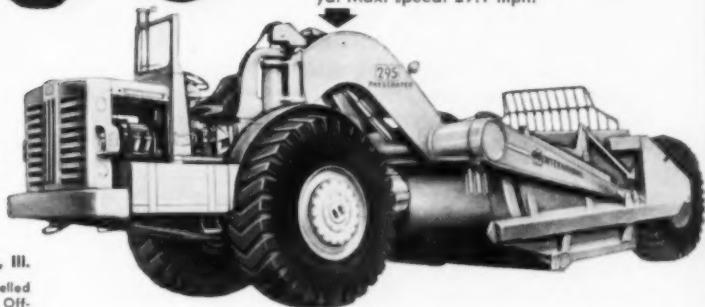
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What Contractors Want

Today's equipment is praised by panel of contractors, who then proceeded to put their fingers on some very important places where further evolution is desired—more accessibility for repairs, better pay-vs-deadweight ratio, faster haul speeds, and others.

By James R. Cummings

Assistant Editor, Roads and Streets

GIVE SOME contractors a microphone and let them talk about "Desired Trends in Earthmoving Machinery" before an audience of equipment manufacturers—and there'll be fun.

"Let's have cabs, hoods and fenders on our haulers that won't dent easily—I'd like to see a real challenge to the shovel operator."

"The crawler tractor is still a leader in performance but it will have to improve to keep up with the rubber-tired prime movers. As one contractor said of a new scraper: 'Push it—hell, we couldn't even catch it!'"

This panel was a feature of the 10th Earthmoving Industry Conference sponsored by the Central Illinois section of the Society of Automotive Engineers, at Peoria, Illinois, April 14 and 15.

Actually there was much more praise than criticism bestowed on today's heavy equipment, and the speakers' appraisal of their tools consisted mostly of constructive suggestions for improving the products of the future. A lively question period brought out some refreshing—and very frank—comments on such matters as tires, sideboarding, and a need for closer contact between manufacturer and customer in the design phase.

First, the introductory talks by the panel members.

● *Off-Highway Haulers.* On the topic of off-highway trucks, L. J. Morgan, superintendent of mobile equipment for the M. A. Hanna Company, Cleveland, Ohio, said that his firm operates about 25 open pit mines in Minnesota. To handle the bulk material at these operations requires a fleet of more than 200 end-dump trucks. Because of this large fleet, the company's first objective in cutting costs is in its haulage equipment; of help here would be larger capacity, better performance characteristics, lower maintenance costs.

For Hanna, larger capacity would have to be accomplished without much increase in physical size, loss of maneuverability or higher axle loadings. The truck box might be a good place to start, according to Morgan. At the present time the box

accounts for 25 to 35 percent of the total tare weight in most end dumps. High alloy steel should permit a reasonable exchange of dead for payload weight with no sacrifice in life. Another thought: could not a light, expandable box requiring yearly replacement be constructed, with the difference in weight being added to payload capacity?

Tires, Morgan said, account for about 35 percent of their truck operating costs. The introduction of nylon cord has helped cut this ratio, as has high profile tires on short, relatively slow speed runs. But a continuing problem is the 24-hour tire inflation check. The many hours of truck time lost here are an incentive toward working for weekly, not daily, inflation checks.

● *Track-type Tractors.* J. M. Clark, vice president of List and Clark Construction Co., Kansas City, Mo., scanned the characteristics of modern track-type tractors. He praised their versatility, but said this was no longer the exclusive property of these machines. The crawler tractors' wide range of usefulness can only be maintained, he said, by improving their ability to do the tough jobs that rubber-tired machines can't do, such as working in mud and soft ground, in rock quarries, rock fills and on steep, rocky terrain.

Regarding simple construction, a simple, straightforward design, Clark said, is easy to understand, and a machine easily understood is easy to maintain. Maintenance of crawler tractors is becoming more difficult not because of lack of training or effort on the part of mechanics but because some of the newer models are just too complicated. Granted that much of this complexity is a result of demands for increased performance, but an effort should be made to retain the simplicity of construction which has been a favored characteristic of crawler tractors.

Motor Grader Trends brought comment by H. W. Hartmann, vice president of McDougal-Hartmann Company, Peoria, Ill. To be successful, he said, motor graders of the future will simply have to produce more than its predecessor and

In Earthmoving Equipment

this will mean higher travel speeds, improved controls and greater capacities. The future motor grader must be easier to operate because it is becoming more difficult to get good operators, according to Hartmann. The mechanism should provide a control over depth and smoothness in a longitudinal plane.

To accomplish greater production, graders are now being made larger. These machines generally do not do well on finishing and fine grading, Hartmann said, since it is difficult to make a larger grader and retain all the performance characteristics of the smaller machines. He believes that motor grader size will stabilize around 30,000 lb. and 150 to 190 hp; work requiring more horsepower will be handled by bulldozers.

● *Tractor-Scraper Qualities.* J. D. Armstrong of J. D. Armstrong Co., Inc., Ames, Iowa, enumerated five basic features of wheel tractor scraper units and described the status of each today:

- **Availability.** In many wheel scraper units today, an availability of 76 per cent is considered good; sometimes it drops to 60 percent. This low percentage is serious and must be raised if this equipment is to compete economically in an earthmoving operation.

- **Accessibility.** If a transmission or clutch can be inspected, serviced or replaced without tearing off half the floorboards, the unit will be available for use much sooner and its operation will be more economical.

- **Maneuverability.** This 30-ton piece of steel (the tractor-scraper) must be able to move in one direction for 30 seconds or five minutes and then bend and touch its own rear in the next 30 seconds. Has an engineering formula been reached that all power and steering should be by the front wheels, or have we stopped using imagination?

- **Transportability.** These machines must be designed and manufactured so that legal permit loads or segments can be moved readily even if the jobs are only ten miles apart. Wheel tractor scrapers with a load and many when empty are over the legal weight limits.

- **Manufacturers Reliability.** The production of construction equipment has met and passed its test in this country, but in five years will the maker be able to supply the parts; will he be liable for what he has produced? Are all these many new companies responsible for their equipment?

As an aside at one point in the discussion, C. H. German, superintendent of the Victoria mine of

Midland Electric Coal Corporation, provided some awesome statistics on the Marion 5760 70-cu. yd. electric shovel used in their strip mining operations. This monster weighs 5,790,000 lb., of which 1,150,000 lb. is ballast, and it is powered by 16 electric motors totaling 4,200 hp. Some specifications: boom length, 140 ft.; dipper handle length, 83 ft.; height to top of gantry, 103 ft.; dumping height maximum, 96 ft.; dumping radius at maximum height, 130 ft.

Contractors Pop Questions

A QUESTION-ANSWER period at the SAE Earthmoving Conference, held in Peoria in April, was moderated by J. E. Jass, Caterpillar's director of engineering. This event brought forth numerous questions, chiefly related to the prepared papers. Following are notes taken down by the Roads and Streets Editors:

Question: What is your opinion of the engines on today's crawler tractors?

Clark: The engine development is 'way ahead of the rest of the unit. It's not perfect but it's not what is causing us "maintenance pain." We keep one spare to every five or ten in service and we have practically no down-time due to engines.

Question: Should the location of controls be standardized?

Clark (of List and Clark): No, I think the development of the machine might suffer.

Morgan (of M. A. Hanna): I'm for standardization. If the operator is accustomed to sitting in a certain way he will feel comfortable if moved to another unit with the same control set-up. The air and auto industries have made great efforts toward standardization for the purpose of safety and have had good results.

Question: On an average Midwest highway job, how much haul road maintenance is justified?

Hartmann: We use two patrols and a water truck for an average sized grading job. There is no need for adding base material on haul roads.

Armstrong: We spend lots of time and money on haul roads—they're the secret of maintaining good production. It depends on the yardage going over the road, its subsoil, and the amount it's used.

HOT QUESTIONS ON EARTHMOVING EQUIPMENT

Question: What standards for earthmoving equipment have been established by contractor organizations?

Armstrong: Contractors are working toward easier movement of equipment from job to job.

Hartmann: In this connection, it's interesting to hear that after six months of testing, some of the early results on the Ottawa test road have been called surprising and they already point toward a relaxation of Illinois' rules.

Question: We've been talking about scraper loads and also about the Ottawa test road; why don't we tie the two together and see if we can't get a test on scrapers up there?

Hartmann: They probably won't allow scrapers, and besides, with the loads scrapers are carrying these days, maybe we wouldn't like the answers when we got them.

We want *rigidity* (cuts down tractive resistance); it may cost a lot but know we will get our money back.

Question: Are you sideboarding your scrapers, even if over the recommended tire capacity?

Clark: All of ours are sideboarded. We have 27.00 x 33 tires and we have found from our experience that it works out okay on the short and medium hauls. As to long runs, well, we want to move dirt, so we just buy a lot of tires.

Question: Are simple controls always to be desired over a complex arrangement?

Clark: The key to the proper selection of controls is productivity; if they can get more production out of more complex controls, contractors will want it that way.

Armstrong (of J. D. Armstrong): Certainly simple controls are most desirable, but if the manufacturer can make out a case for a more complex design and prove that it offers the best in productivity and safety, I will buy what he says.

Question: Can today's operators handle tractors with dozers at 4 and 5 mph?

Clark: The speeds generally used these days are at, or close to, 4 mph for present equipment.

Jass (of Caterpillar): We actually are feeling pressure from contractors who want to be able to operate consistently at 4 mph.

Question: Is compaction equipment in use today able to keep up with the dirt deposited on fills?

Hartmann: The Illinois division of highways used to limit the size of compaction equipment but not any more; they're just looking for results now. We ourselves use sheepfoot rollers, also vibratory equipment.

Clark: When we use a sheepfoot we pull it with a rubber-tired tractor; but we use a 50-ton roller whenever possible. If the moisture content is right, though, most anything will do. In my opinion, a lot of work is still to be done on this problem of compaction.

Armstrong: In Iowa, compaction gets a lot of attention because we see a broad reach of compaction problems, from virgin soil in the southern part of the state to glacial composition in the north. I'd say we use a sheepfoot mostly.

Question: What haulage equipment do you use in coal mining?

German: Fifty to 80-ton trucks with 325 to 450 hp diesel motors and single axle drives.

Question: If we had single tire design instead of dual, could we live with the limitation this would put on our top speed?

Morgan: That's a good question. As it is now, we have a particular 10-mile haul we are making at 22 mph and we're just barely getting by. Our average year-round haul speed, by the way, is 6 mph.

Question: Do you like cable or hydraulic controls on crawler tractors?

Armstrong: We have been using cable, mostly because of its ready availability and also because of the cost factor. But with the price rise in cable recently it's starting to cost more than oil so now we're starting to think hydraulic.

Clark: We use nearly all cable.

Hartmann: Both.

Morgan: We have hydraulic. We don't want cable. There are maintenance problems with hydraulic, but we want the down pressure.

Question: Can the designer understand the contractor's philosophy?

Jass: We are really trying to, for our own benefit as well. We are beginning to realize, for example, that proving ground tests aren't enough.

Clark: Shouldn't there be a conference organization set up between the manufacturers and the earthmoving contractors as there is in the lumber business?

Armstrong: The aviation industry relies much on the pilot's judgment. Manufacturers should give their engineers two years of on-the-job training so that the equipment that engineer designs in the future would carry features which the contractor himself has in mind.

Jass: We don't want to expose him to the contractor: we're sure he'd stay in that more lucrative field!

29,000 lbs. - and all muscle!

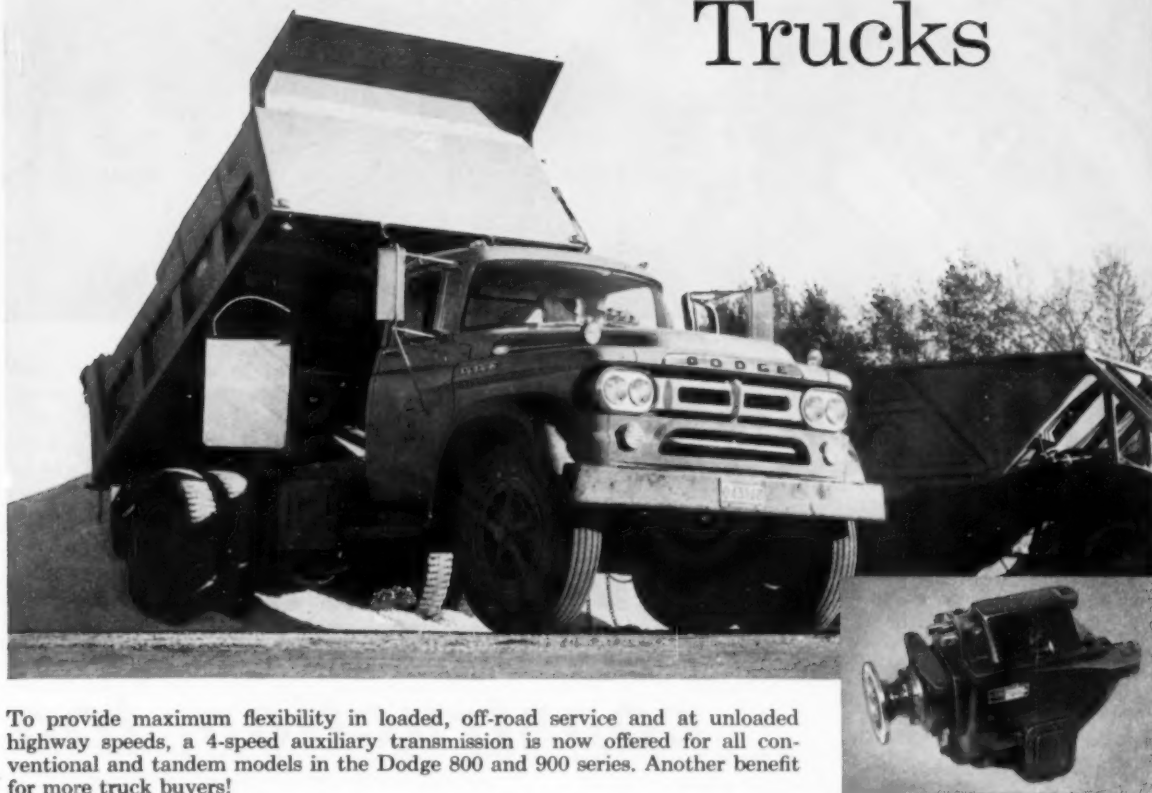
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Highway Planning Will Help Reshape Cities

Utah Highway Conference produced basic thinking on a wide range of highway engineering and administrative subjects.

By H. K. Glidden

Contributing Editor to Roads and Streets

Highway conferences or short courses blossomed out again this spring in a score of states. High on the list of these invaluable state get-togethers was the 20th Annual Utah Highway Conference, sponsored by the Civil Engineering Department of the University of Utah, under Professor Grant K. Borg.

Speakers on the 2-day program (March 3-4 at Salt Lake City) covered many topics. Here are random "kernels" and excerpts:

Officials Can Produce Better Cities

Walter Smith, assistant director for field activities of the American Municipal Association; Local officials now have a golden opportunity to produce better cities. However, to do so they must plan as they have never planned before. The best current source of material upon which to base such planning, he said, is a publication of the National Committee on Urban Transportation entitled "Better Transportation for Your City." He described this manual as an intelligent aid in that it (1) seeks to attain the over-all goals of sound community planning and development, (2) is adaptable to any community or metropolitan area, (3) brings together into a coordinated effort all functions concerned—at the least possible cost, and (4) offers fact finding programs that must precede sound engineering solutions.

Slums in the Country?

Lamont B. Gunderson, chair-

man of the Salt Lake County Commission, speaking on "The County's Interest in the Federal Highway Program" reviewed many problems the counties must meet and overcome as the Interstate system cuts its controlled-access way across a multitude of county roads. In most instances the county must decide either to dead-end, relocate, or take such roads over or under the Interstate highway.

In the area of advanced planning, Gunderson visualized an immediate need for control of developments at newly-created vital points. He feels that planning must provide for prevention of slum development at interchanges; utility services, policing, schools and other public services in areas where little such need has existed before.

Also, the county must anticipate a shifting of the tax pattern as changes in land usage results from construction of the Interstate system. He advocated early adoption of master plans, zoning and regulations. "If this is accomplished intelligently and with a long range over-all plan to work toward," he observed, "the Interstate system can produce substantial benefits rather than burdens upon local areas and their governments."

Factual Data Aids Right-of-Way Acquisition

John F. Yeager, division right-of-way representative, U.S. Bureau of Public Roads, cited the fact that 34 percent of Utah's allotment of high-

way funds is presently being spent for acquisition of right-of-way as the basis of his appeal for a re-evaluation of right-of-way personnel. He stated that these agents have now attained professional stature, requiring high and varied educational backgrounds.

While he paid tribute to the virtues of advance acquisition, he most firmly stressed the need for planning and cooperation. He would have R/W agents carefully prepared and briefed before they contact the public, as he feels that these agents carry out the greatest degree of direct public contact.

Yeager also stressed the need for factual data in all situations. He advocated a growing use of studies related to the effect of highway location, economic impact, social impact, land economics, tenant relocation and various compatible studies. He classed such factual data as invaluable negotiation material.

How Equipment Distributors Can Aid Road Program

Frank Skidmore, director of industry relations, Associated Equipment Distributors, pinpointed the wide and valuable role of the equipment distributor in the highway picture. Instead of being just a go-between, he illustrated the services of this group to include:

- (1) Hiring of specialists—often engineering graduates with much practical experience, trained in construction "know how;"
- (2) Demonstrating new equipment;
- (3) Providing outlets for used machinery through a wide range of contacts—in and out of road building;
- (4) Help in financing—special deals—refinancing—banker education in machinery loan opportunities;
- (5) Tax consultants in machinery depreciation;
- (6) Round-the-clock service and maintenance; and
- (7) Screening and forwarding field suggestions to the manufacturers.

Public Relations

J. W. White, regional planning and research engineer, U.S.B.P.R., speaking on the subject "Highway Planning as an Administrative Aid" told of the highway planner's need for factual data upon which to base his decisions. He felt that selling the public on typical bypass relocations and freeway improvements requires digging into all as-

pects of non-user benefits and economic impact studies. His answer to the problem, "Give full recognition and staff status to the director of planning and research, then let that office handle special traffic and economic studies needed to support proposed highway location and the choice of the type of facility."

Closely related was John F. Yeager's expressed belief that engineers must furnish their R/W agents with accurate information if the reputation of highway officials is to be maintained. Contact with the public must be well planned, he feels, and the agents armed with comprehensive appraisal reports and a thorough training in good salesmanship.

Ground Surveys for Photogrammetric Mapping

Herbert P. Lee, general manager, Aero Service Western, called attention to the splendid opportunity which the highway program allows for long-range ground control data. He feels that the requirements of both the photogrammetrist and the highway engineer can be fulfilled at minimum cost by careful planning of the ground surveys for the entire highway program. Lee recommended a carefully detailed procedure in establishing both basic and supplemental or photo control with close cooperation and coordination of ground and photographic activities.

Maintenance of Asphalt Surfaces

Representing the Asphalt Institute, W. L. Hindermann, managing engineer, Midwest division, called for a new look at the important role maintenance plays in the overall lifetime cost of both flexible and rigid pavements. His plea was for better planning, more thought and an upgrading of maintenance personnel. He feels that present practices are allowing us to lose a large share of our investment in highways, partly due to the lack of glamour in maintenance activities. He called for the installation of more engineers in the maintenance area to reduce the tendency to slop over this aspect of highway utility.

Copies of Proceedings

Bound copies of the proceedings of this conference can be obtained from Conference Director Grant K. Borg, Head, Civil Engineering Department, University of Utah, Salt Lake City, Utah.

Tips on Uniformity in Subgrade and Subbase

The growing appreciation of the importance of uniform support under concrete pavement—or any pavement—was noted by a speaker at the recent Utah Highway Conference. Walter C. Oram, Rocky Mountain regional paving engineer for the Portland Cement Association, reviewed some of the detailed practices necessary to get uniformity in subgrades and bases. He credits these practices as representing the most important single factor in the ultimate performance of a concrete pavement. He cited PCA's findings from field studies conducted since 1952 in cooperation with the highway departments of North Carolina, New York, Michigan, Indiana and Missouri which furnish a convincing argument for closer control of construction practices.

Under the general heading of construction practices, Oram included measures to avoid segregation of pit material, proof rolling with a heavy "super" compactor to locate soft spots in the subgrade, selective grading and cross hauling during subgrade construction, moisture control involving a thorough mixing instead of a surface application, high initial densities, and careful control of gradation and rolling practices in fine grading. His plea in this regard was for uniformity; trouble was found to start when a letdown in any of these construction practices allowed pockets of dissimilar gradation or densities to exist.

Oram went so far as to say that construction practices have more effect on pavement performance than do the pavement type itself, or the factors of width or thickness of subbase, type of subgrade soil, and variations in climate, particularly in states where frost action is experienced.

Oram cited the fact that many contractors are finding the use of pugmills to be an easy and economical answer to the uniform mixing of both subbase material and water. His experience indicates that the slight additional cost of this method is offset by the ease of placing and compacting the material.

On the subject of rollers, Oram felt that 10 to 20 ton steel-wheeled rollers produce satisfactory densities on most granular materials except cohesionless sands. He noted a tendency for these rollers to ride

on the high spots if the material has a maximum size greater than 1½ in. He commented favorably on the kneading action of rubber-tired rollers and their ability to adjust to uneven surfaces and local areas of loose materials. Vibratory compactors, both pan and vibrating rollers, are now widely used to obtain high densities in many types of granular materials. Oram stated that they have been found to be particularly effective for cohesionless sands used as subbase material.

Oram stressed the need for care in fine-grading and final compaction ahead of the paver. He pointed out the difficulties encountered when pit-run gravel containing large stones is used. Final compaction should restore the initial high densities to the top 1 and 2 in. of material disturbed during fine grading operations. Particular care is necessary next to the side forms since the slab edge is a critical area for stress and deflection.

ARBA-BPR CONFERENCE

(Continued from page 72)

that the committee should explore this subject thoroughly, in order to determine what applications of the "end-result" principle are practical.

The new study will include a re-examination of specifications dealing with surface smoothness, tolerances, ways to lengthen the construction season, procedures to carry forward urban highway construction with a minimum of disruption of business and traffic, and the most economical methods of obtaining sources of materials for aggregates.

In other business before the meeting:

(1) The need for contractors to have ample opportunity for site inspection and preparation of bids. It was pointed out that this is particularly important in the case of large Interstate projects.

Taking into account the importance of keeping contractors' working capital as active as possible, the group discussed the subject of retainage, including the practice of underestimating the quantities of work accomplished. This practice is known as "private retainage."

(2) Delays in the receipt of final payments. Consideration was given to some suggested means of reducing these delays.

(3) Importance of including pay-

ments for extra work in partial payments.

(4) Applications of new electronic methods to engineering, construction and testing.

(5) Procedures regarding pre-qualification of highway contractors.

(6) The group took note of many recent improvements in construction equipment, and discussed the desirability of modifying specifications to permit the full utilization of modern equipment.

(7) The extent to which authority is delegated to the field in order to expedite construction was explored, along with other factors of possible delay such as tardiness in obtaining right-of-way clearance and moving utilities.

● Participating in the discussions for the Bureau were H. A. Radzowski, division chief; William Dillon, chief of procedures and operations branch; and John Laing, chief of road equipment branch, division of development.

Contractors serving on the committee with Mr. Gay are: H. C. Adams, Carey Construction Co. and H. C. Adams, Lexington, Ky.; Paul L. Andrews, executive secretary, Georgia Highway Contractors Association; S. Howard Brown, Brown, Davis and White, Grant-

ville, Pa.; John J. Curtin, Jr., Washington Contractors, Inc., Washington, D. C.; William E. Hardy, executive secretary, Maryland Highway Contractors Association; R. A. Harris, engineer-director, Mississippi Road Builders Association; Ralph Heffner, Heffner Construction Co., Celina, Ohio; E. E. Hoebel, executive secretary, Wisconsin Road Builders Association; John P. Keeley, Keeley Construction Co., Clarksburg, W. Va.; L. W. Lamb, Lamb Construction Co., Holland, Mich.; James E. Lambert, Lambert Construction Co., White River Junction, Vt.; Ed G. Langston, Langston Construction Co., Orlando, Fla.; Robert McDowell, McDowell and McDowell, Nashville, Tenn.; Hugh McMillan, El Paso, Texas; E. N. Rodgers, engineer-manager, Alabama Road Builders Association; Donald B. Stabler, Harrisburg, Pa.; J. W. Thompson, Thompson-Arthur Paving Co., Greensboro, N. C.; and D. O. White, American Asphalt Paving Co., Chicago, Ill.

Members of the ARBA staff who participated in the discussions were Maj. Gen. Louis W. Prentiss, USA (Ret.), executive vice president; Burton F. Miller, deputy executive vice president; W. Gay Gunn, managing director, Contractors Division; and T. Randolph Russell, director of public relations.

SURETY LEADERS

(Continued from page 76)

about as much work as he can properly finance and efficiently handle—and yet, for particular reasons wants to bid another job—he may find it advantageous to form a joint venture with a good competitor. A joint venture, or a merger of an old, well-established firm with a young, aggressive firm, could, in my opinion, add strength to both. Many old establishments could use some new blood—and there are many young firms in need of the experience and finances the “oldies” could offer. Each should complement the other—and with taxes as they are, such combinations could be advantageous to all.

Some of our enterprising and too ambitious bonding agents have contributed no small part to the unhealthy financial conditions of some contractors, and to the unstable market conditions of our industry. Some such agents have at times consistently encouraged the

undermanned, underfinanced and inexperienced contractor to bid three, four and five times the work program he had previously handled, or that he is capable of and organized to handle.

These contractors usually succumb to a combination of their own ambition and desire to get ahead, plus “sweet talk” and encouragement from certain agents—agents who instead of trying to be a real partner and sound advisor to the contractor, come out and pat the guy on the back and assure him they’ll take care of him.

● And it is only human for that contractor to believe what they tell him. In my opinion, the soundest advice the surety man can give is for the contractor to operate on a “crawl-walk-run basis” rather than on a “crawl-fly” basis. When a contractor, with the assistance and encouragement of a bonding company stretches his credit too far, he retards his ability to expand and grow on a sound basis.

Bonding companies would do

well to recognize the fact that borrowed credit is a poor substitute for ability and experience.

I think we should take off our hats to the surety people who had adhered to the “crawl-walk” philosophy, and who preach “conservatism.” In my opinion they can contribute much to the betterment of this unhealthy situation.

● *Encouraging More Bidders.* These bonding agents who are so actively engaged in this type of promotion are only adding to the number on the bidder's list and increasing the mortality rate in the construction industry. This whole picture, however, has been somewhat bettered in recent years. The mortality rate in the construction industry is disastrous enough without the prodding by the surety people to make it even worse.

To get back more in line with the subject at hand, and the bonding relation between the general contractor and the subcontractor, I think it would be very fortunate if a universal plan could be adopted, whereby all general contractors, as a matter of policy, require that a performance bond be furnished by every subcontractor when he is awarded his subcontract.

● If the subcontractor knew when he bid the job that he would be requested to produce financial statements and prove his capabilities and experience and to secure a performance bond in connection with his subcontract, he would take a second look before taking a careless chance of getting the job. I feel that there are too many unqualified, irresponsible contractors bidding on the various items of work, and too many general contractors bidding on work they are not capable of handling, organizationally, financially or experience-wise.

Many of the larger general contractors because of policy in their company, request a performance bond from each subcontractor. However, we all know that in too many cases general contractors only require a performance bond from a sub when the sub is substantially low, and when it looks like he would probably experience failure, thus leaving the bonding company holding the bag. This, I am sure, we all agree is not just or proper.

General contractors believe in pre-qualification and, certainly, the bid bond is, in a sense, pre-qualification. Why not then require a bond for all subcontractors? This would, as I mentioned, be a form of pre-qualification for the sub.

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Wire Fabric has minimum tensile minimum yield point of 60,000 psi...

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For more than 50 years, USS American Welded Wire Fabric has been doing an outstanding job of reinforcing all kinds of concrete work—from porches and walks to skyscrapers and highways. And now—because of its greatly increased tensile and yield strength—it will give even greater strength, longer life, increased freedom from cracking and less maintenance. Also, it will permit longer joint spacing for reinforced slabs on ground or less steel if present joint spacing is used. The new improved Welded Wire fabric will have a 75,000 psi minimum ultimate tensile strength with a minimum yield point of 60,000 psi.

Closely controlled laboratory tests show that if the conventional bond stress theory is applied to American Welded Wire Fabric's resistance to slip, fantastically high bond stress values of from 1,000 psi to 2,700 psi are computed. (See ACI Proceedings, Vol. 48, April, 1952.) Continuing bond test research under the direction of American Iron & Steel Institute has shown such good mechanical anchorage in the concrete as to permit this increase in the Tensile Strength of Fabric. American Steel & Wire is able to present this new product because of the tested bond values which enable designers to take advantage of a higher fabric yield point.

Just one example of the advantages of this improved fabric is in one-way slabs. The ACI Building Code 318-56 will allow unit tensile strength for fabric in main reinforcement of 30,000 psi in one-way slabs of 12-foot span or less, provided reinforcing members are $\frac{3}{8}$ " or less. Previously, designers were limited to 28,000 psi working stress with fabric, and only 20,000 psi with intermediate grade bars.

The new Welded Wire Fabric will cost no more. It will come in the same prefabricated rolls or sheets for easy handling and placing. Therefore, to get the improved product on your job at no extra cost, be sure to specify USS American Welded Wire Fabric.

USS American Welded Wire Fabric is available in a wide variety of styles, sizes, lengths and widths . . . in wire gauges from $\frac{1}{2}$ " diameter to 16 ga., and in longitudinal and transverse wire intervals of 2" to 16". Steel areas for all normal structural reinforcing in all types of construction are readily available. For more information on USS American Welded Wire Fabric—and its new tensile strength—write to American Steel & Wire, Dept. 988, 614 Superior Avenue, N. W., Cleveland 13, Ohio.

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Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

Always ask, *"is it Reinforced"*

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ROADS AND STREETS, June, 1959



"Spotty, as a digger, you just ain't got it!"

Without realizing it, Billy has hit upon a basic truth in the excavating business. To come out on top, you've got to use the best equipment for the job.

With many factors beyond a contractor's control, choosing the right equipment becomes especially important. For this is one thing a man *can* control.

That's why so many contractors choose Bucyrus-Erie. They have learned . . . as their fathers did before them . . . that B-E machines are built for more than ordinary digging. They are built to handle the toughest jobs — and still perform better.

**BUCYRUS
ERIE**

Structure Concrete Mixed in Improvised Set-Up

These pictures show a subcontractor mixing structure concrete, for work on a remotely located Interstate relocation project (US 70) in the central Tennessee hill country.

Concrete for several bridges and culverts scattered through this project was mixed and supplied by John Stites, of Cookeville, Tenn., as follows::

1. A trailer with weather-proof van-type body was stationed on one side of the roadway on an existing small bridge, centrally located with respect to the job. This van carried bagged cement, and was set up on blocks, being re-stocked as needed by deliveries from the cement source.

2. Bags were broken and cement chuted over the railing, and down

via an elephant trunk into a truck mixer, stationed in the dry creek-bed below. The mixer had previously taken on aggregates.

3. Aggregates stockpiled adjacent to the site, were loaded into a small proportioning bin by a TD9 International Harvester tractor equipped with a front-end scoop.

4. Aggregates were belted, one size at a time, into the truck mixer, using a weighing scale in conjunction with a feed box to the belt. Well or creek water constituted no special problem of supply.

L. B. "PHIL" PHILIPPI has been named to head a new Truck Sales Division being established by Le-Tourneau-Westinghouse Company of Peoria, Illinois. Marketing Vice President L. A. DePolis, stated that Mr. Philippi will direct world-wide merchandising activities of the new "Haulpak" line of end-dump and bottom-dump trucks.

● Some views of the truck-mixer taking on cement from upstairs as part of unique set-up



● Cement van on bridge is supplying cement, via elephant trunk, into a truck mixer, which gets its aggregates from the bin and belt seen in foreground.



BIG PERFORMANCE

Hauling tremendous 230-ton transformers over soft roadways demands equipment capable of tremendous performance. Such performance is found in this new super Mack tractor recently purchased by Gerosa Haulage and Warehouse Corporation, New York.

Gerosa, noted for taking on the biggest, toughest and most unusual hauling jobs, for years has successfully teamed up with Macks . . . and found them equal to any job tackled. Mack transmissions, famous for built-in quality and stamina, stand up to the most demanding jobs. And for unsurpassed pulling power under the most adverse conditions there is nothing comparable to the Mack-built Balanced Bogie with exclusive Power Divider.

Big dramatic job—every-day bread-and-butter job . . . whenever it must be done efficiently, dependably, with the least downtime, there's a Mack that will best fill the bill.

See your Mack branch or distributor for all the facts on the most complete line of heavy-duty trucks available today. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

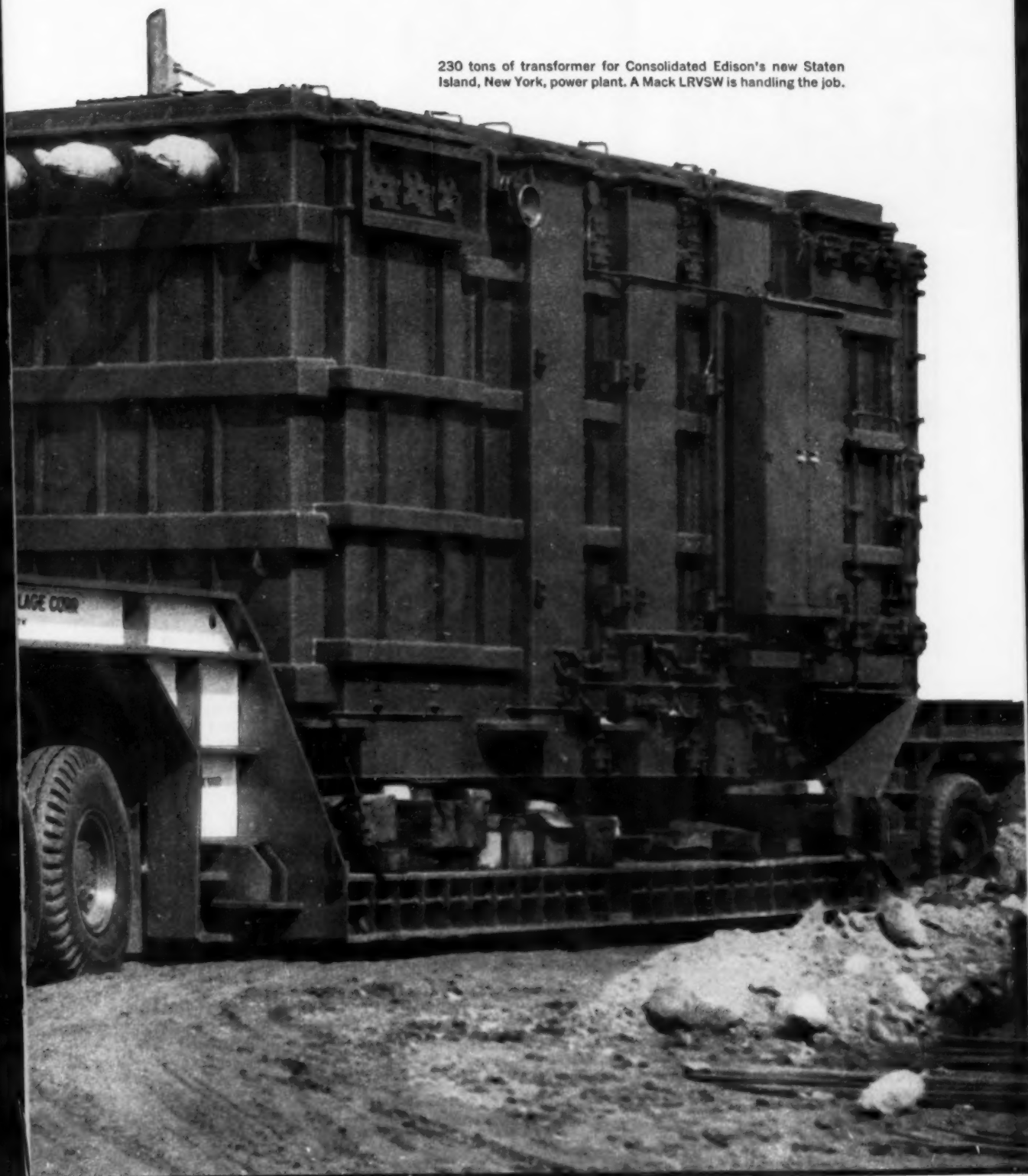
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230 tons of transformer for Consolidated Edison's new Staten Island, New York, power plant. A Mack LRVSW is handling the job.

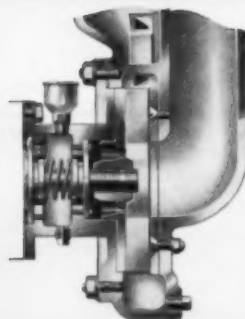


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Specially designed open-vane, balanced impellers, guaranteed to pass spherical solids equal to 25% of inlet diameter, are featured in Essick Pumps. The impeller eye is of ample diameter to pass material which easily clears through the extra wide vane passage ways.

**Trouble-free operation with no-clog assurance and self-cleaning action, is automatic in all Essick Self-Priming Pumps.

A COMPLETE LINE OF CONTRACTORS PUMPS FROM 4,000 GPH TO 240,000 GPH INCLUDING DIAPHRAGM PUMPS, HIGH-HEAD PUMPS, AND BELT DRIVE OR DIRECT CONNECTED PUMPS FOR ELECTRIC MOTOR OR GASOLINE ENGINE DRIVE.

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Traffic Safety

Turnpike Study Indicates Interstate Safety Potential

By B. H. Bowman. Driver Education News (Ford Motor Co., Traffic Safety and Highway Improvement Dept., Dearborn, Mich.), October 1958; also reviewed in Highway Research Abstracts.

A two-year study has been made of all accidents experienced on the main traveled lanes of the Ohio Turnpike. The conclusion should be of interest since they undoubtedly indicate what to expect on the Interstate Highway System.

The accident rate established for the winter months was much higher than that for the summer months. The winter season has an accident rate of 206, while the summer months maintained a rate of but 98.

It became very apparent that grades had a very direct relationship to accidents. This is not new information, but when the grade restrictions are as rigid as those on the Ohio Turnpike it is rather startling.

Sixty-two percent of all accidents occurred under "dry" pavement conditions. "Snowy" or "icy" conditions prevailed during 26 percent of the accident occurrences. "Wet" pavement existed when 12 percent occurred.

Light conditions at time of accident occurrences was given consideration. The hours of darkness account for 48 percent of all accidents. One and eight-tenths percent of the occurrences were experienced at night in areas that were illuminated by roadway lights.

Twenty-eight percent of the accidents reported were of the rear-end collision variety.

Taking the 62 rear-end collision accidents alone, 5 percent of them resulted in fatalities, 60 percent caused personal injuries, and 35 percent were property damage accidents. These percentages illustrate the severity of the rear-end collision type accidents at high speeds.

Important Ohio Turnpike structural characteristics are minimum width between travel lanes, 56 ft.; width of outside shoulder, 10 ft.; width of inside shoulder, 8 ft.; minimum sight distance, 900 ft.; and minimum width of 124 ft. between the outside edges of the outside shoulders.



Step 1: Burned out lamps in the Lincoln Tunnel's continuous fluorescent lighting system are removed by one workman on a truck that must stop only momentarily. This electrician shows how he handles the lighting package.

Step 2: On-the-spot replacement can be made with a cleaned carrier containing fresh fluorescent lamps. The



carrier fits against a spring inside a wall fixture and slips into place against its contacts.



Step 3: Back in the Port Authority maintenance shop at New Jersey end of the tunnel, carriers are cleaned, filled with fresh lamps, and made ready for reuse in the tunnel to replace other burned out lamps.

Highway Lighting

Tunnel Fluorescents Easily Serviced

A program of regular maintenance, aided by a novel lighting system that takes only seconds for on-the-spot servicing, is keeping nearly three miles of fluorescent lamps in top working order in the Lincoln Tunnel connecting New York and New Jersey.

The lighting system was developed by Port of New York Authority engineers, using equipment supplied by the Simes Company, Inc. It was installed in the third tube of the tunnel in May, 1957. This new tube, along with two existing ones, is operated by Port of New York Authority. The three-tube Lincoln Tunnel carries nearly 25 million vehicles a year under the Hudson River in and out of Manhattan.

Considered unique at the time of its installation, the Lincoln Tunnel lighting system is operated on a 1,200-volt parallel circuit instead of a series circuit conventionally used. Among other advantages, the parallel circuit simplifies maintenance of fixtures. Mounted on the tunnel walls near the ceiling, the fixtures

hold individual packages of two fluorescent lamps each, in pyrex glass carriers.

Replacement of burned-out lamps requires only a momentary stop for a maintenance truck. Extra glass carriers, already equipped with two new T-12 fluorescent tubes, are aboard the truck. After the carrier containing the burned-out lamp is slipped from its fixture, a new carrier is inserted in the system.

As operated by the Lincoln Tunnel maintenance department, the lamp servicing program is a simple three-step operation. Extra supplies of lamps and carriers are kept on hand. The first step is to inspect the tunnel lights regularly and remove burned-out units. Second, these are replaced with fresh carriers and lamps. Finally, in the maintenance shop the old lamps are removed from the carriers, which are then cleaned and refilled with fresh lamps. This system cuts down the amount of time tunnel

lanes must be closed for replacement of lamps.

Until recently this procedure was normally followed several times a week by members of the tunnel's electrical maintenance crew. However, as the expected service life of operating lamps is reached, the maintenance department expects to phase into group relamping instead of individual lamp replacements. Group relamping will also permit mechanization of cleaning operations in the shop.

The even and glare-free light produced by the fluorescent lamps provides high levels of illumination for drivers in the tunnel. The system "washes" the white tile walls of the tunnel with light, instead of illuminating the surface of the roadway.

Sealed completely once the lamp carriers are in place, the lighting system resists the attacks of any detergents used to wash the inside of the tunnel. The carriers are washed automatically at the same time as the tunnel walls and ceiling.

BETTER, BY FAR...For Rugged,

COUNT ON EXTRA PERFORMANCE WITH THESE SPOTLIGHT FEATURES



BALANCED LIFTING—Integral construction of lift arms and torque tube eliminates damaging "one-arm" stresses...insures equal lift on both arms even during hillsides dumping or with unbalanced loads.



NO OVERTRAVEL DAMAGE—Positive backstop plus powerful cylinder head spring provides complete protection against overtravel damage, reduces maintenance costs.



HIGHER DUMPING ANGLE—Up to 55° for faster, cleaner dumping of any material. Speeds work cycle...ends damage from jockeying to loosen load.



Trouble-Free Dependability!

GarWood-St. Paul truck equipment, designed and built by the world's leading manufacturer, has a proud record of consistently outperforming under the toughest conditions. Because GarWood-St. Paul builds quality in you get dependable, trouble-free performance.

It's the most advanced and complete line of arm-type, front-mounted and under-body-mounted telescopic hoists, with matching bodies for every job requirement. Your nearby distributor can demonstrate why you can be sure of dependable, economical performance when you specify GarWood-St. Paul truck equipment.

FIRST...WITH THE FINEST IN JOB ENGINEERED CONSTRUCTION EQUIPMENT



GAR WOOD-BUCKEYE DITCHERS give you advanced "extras" at no extra cost...modern features that pay off in increased production, ease of operation and low maintenance costs. Standard equipment on wheel-type ditchers includes hydraulic conveyor drive with three speeds in either direction; hydraulic digging wheel hoist for fast, accurate adjustments; simplified group controls and "ditcher designed" transmission.



GAR WOOD TRACTOR EQUIPMENT is engineered for trouble-free performance under the biggest and heaviest loads. Gar Wood equipment includes front- and rear-mounted cable control units, Tipdozers, Dozecastors and Rippers, all matched to rugged Euclid Tractors.

... for more details circle 316 on enclosed return postal card

ROADS AND STREETS, June, 1959



GAR WOOD EXCAVATORS excel in on-the-job versatility. They feature a compact machinery deck that puts all adjustments up front, easy to see and reach; independent chain crowd that means more power into every "bite" and easy convertibility for every job requirement; plus independent travel to let you hoist and swing while moving.

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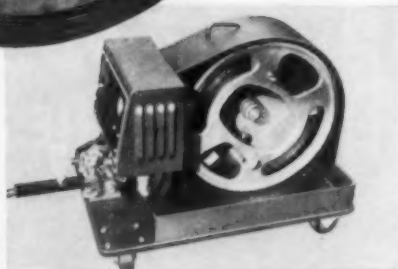
**"Stoody
SEMI-AUTOMATIC
Hard-Facing
*Splits my work in half!"***

Here's a welder's own words about semi-automatic hard-facing on roll crushers... "I can do as much work in 4 hours with Stoody Semi-Automatic Hard-Facing as I used to do manually in 8 hours. The metal doesn't get as hot, and I can make a higher, wider bead—with less effort. You just can't beat these machines for hard-facing no matter how hard you try."

If you want to cut down on your own work, if you want to *accomplish more* in a given time, you should try Stoody Semi-Automatic Hard-Facing!

We'll be glad to arrange a free demonstration in your plant, hard-facing *your* parts. You be the judge!

Stoody semi-automatic wires are supplied in continuous coils and can be fed through most standard types of semi-automatic welding machines. A wide variety of alloy types cover all job requirements.



Literature is available.

Ask your nearest Stoody Dealer or write direct to the company.

STOODY COMPANY

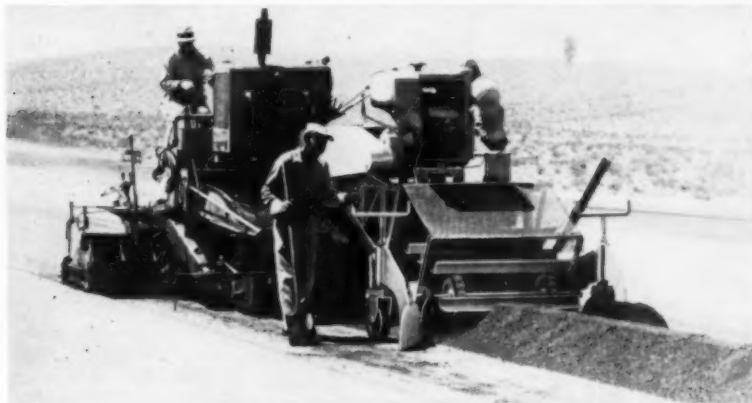
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New Products

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Clark Asphalt Paver Feeder

Asphalt Paver Feeders

Clark asphalt paver feeders, Models 4590 and 6009, are now in production at Koehring Company of California. Both are self-powered. A capacity of 250 tons per hour is possible—or up to 400 tons with the larger Model 6009.

Either model can be mounted on the paver via lugs which are a part of the feeder unit. These lugs are simply pivoted into position and welded to the paver. Head and tail shaft centers are adjustable. A wide charging-end guides the windrow into the feeder. Wheels are adjustable vertically with hand screws to adapt to existing conditions. Proper sizing of the windrow when using bottom-dump trucks is accurately handled with a truck towed Clark Windrow Sizer. The Ko-Cal Windrow Sizer is available when end-dump trucks are used. Both sizers are adjustable and give proper size windrow to make specified pavement.

Koehring Company of California, 2200 Country Club Blvd., Stockton 4, Calif., or Koehring Expert Division, Milwaukee 16, Wis.

For more details circle 101 on Enclosed Return Postal Card.

Rotary Drills

Three new and improved models of its Type 8 rotary drill are announced by Davey Compressor Co. Model M-8A is a rotary blast unit, designed for mounting on any standard truck. It has rated capacity in excess of 1500 ft., using 27 $\frac{1}{8}$ -in. API drill pipe. The M-8AL model is similar but is equipped with a special long kelly and mast. It can drill 24-ft. ledges without changing steels. Model M-8MA is a combination air blast and mud



Davey Model M-8A Rotary Drill

rotary rig, with any one of several types of mud pumps available to match job requirements.

Davey Compressor Co., Kent, O.

For more details circle 102 on Enclosed Return Postal Card.

Portable Barricade with Emergency Power

A new portable barricade, developed by Wald Industries, has a self-contained gasoline generator that provides power to operate warning flashers, floodlights, power tools, and other services.

The new units, named "Electricades", can be towed quickly by car or truck to the scene of an emergency and put into operation in a few moments. Panels unfold to present a highly reflective barricade with sealed-beam warning flashers. Messages for the face of the panels, to direct traffic, are readily interchangeable.

Two models are available. The "Senior" (Model 2000-W) is fitted with a 2000-watt generator, and the "Junior" (Model 500-W) with a 500-watt.

Wald Industries, Inc., Huntingdon, Pa.

For more details circle 103 on Enclosed Return Postal Card.

40-Ton "CraneMobile"

A new performance-proved 40-ton capacity "CraneMobile", Model 610-T8440, is announced by Bay City Shovels, Inc.

The integrally designed Bay City-built 8 x 4 carrier features removable outrigger beams and supports, double-duty air brakes on all wheels, power steering, and variable speed transmission with 12 speeds forward and three reverse. The complete machine can easily



Model 610-T8440 "CraneMobile"

and quickly strip down to 17,270 lb. per rear axle and 13,120 lb. per front axle.

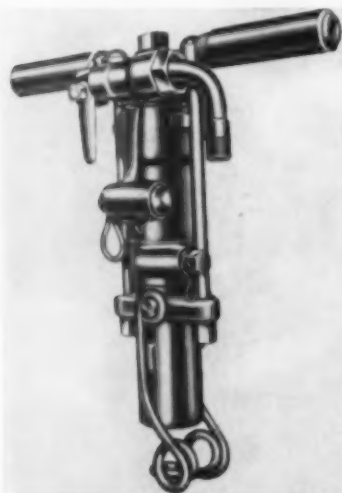
It is stated that the 610-T8440 can easily lift and walk with a 63,000-lb load, and can handle 5,000 lbs over the rear on 150 ft. of boom at 100 ft. radius. The machine is convertible to crane, clamshell, dragline, or pile driver.

Bay City Shovels, Inc., 2611 Center Ave., Bay City, Mich.

For more details circle 104 on Enclosed Return Postal Card.

Lightweight Rock Drill

A new rock drill is announced by Davey Compressor Co. Known as Davey-Holman Model SL-9D, it has a net weight of 42 lb., handles easily in any position, and is said to possess unusually high output work capacity. An outstanding tool feature claimed is the ease with which it can be converted, without dismantling, from blower type



Davey-Holman Model SL-9D

to blast type or to wet type with manual valve. By the addition of only a few parts, the SL-9D can thus be made suitable for practically any drilling condition. Alternate rotation speeds are also available.

Davey Compressor Co., Kent, Ohio.

For more details circle 105 on Enclosed Return Postal Card.

Steam-Jet Cleaner

A new 100-gph, portable oil-fired steam-jet cleaner, useful for on-the-job cleaning of construction equipment, has been introduced by Pantex Manufacturing Corporation. Mounted on four large, rubber-tired wheels, the new cleaner is a completely enclosed, compact machine with built-in soap tank and controls. It can be operated



Speedystream "100" Steam-Jet Cleaner

on kerosene or No. 1 or No. 2 fuel oil. Ignition is fully automatic and fuel pressure is modulated to develop the gun-nozzle pressure desired, as shown on an easily visible gauge. Heating coils are 1/2 in. in diameter, continuous wound for maximum efficiency and tested for 1,000 psi.

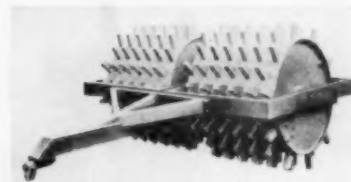
Steam Generator Division, Pantex Manufacturing Corporation, Pawtucket, R. I.

For more details circle 106 on Enclosed Return Postal Card.

Tamping Roller

A new tamping roller, the Model 170, now in production at Koehring California Co., has tamping feet that are shaped to penetrate and withdraw from loose fill with a minimum disturbance of the fill material, and to readily clean when working on sticky material.

Each of the two roller drums has 20 rows of tamping feet, six per row. Pressure on the feet when drums are



Model 170 Tamping Roller

empty is 207 lb. per sq. in.; when 75% filled with water, 298 lb.; and with drums 75% filled with sand and water, 373 lb. Drums empty weigh 17,150 lb.; with water, 24,650 lb.; and with sand and water, 30,680 lb. Overall working width of drums is 11 ft. 1 in. Entire unit can be dismantled for transportation by removing only 16 bolts.

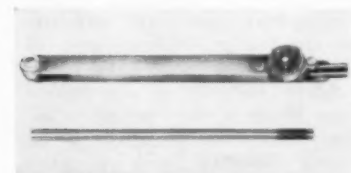
Koehring California Co., 2200 Country Club Blvd., P. O. Box 1891, Stockton 4, Calif.

For more details circle 107 on Enclosed Return Postal Card.

Torque Wrench

An improved design of its heavy duty dial indicator type torque wrench for use in the construction field has been announced by Apco Mossberg Co.

Design features include a machined



RDF-1000 Construction Torque Wrench

aluminum casting and lightweight construction. Total weight is 22 1/2 lb. The wrench measures 51 in. long, excluding removable extension handle, and is specifically designed for construction's tight quarters and rugged usage. A 1 in square drive fits all heavy duty sockets.

Apco Mossberg Co., 1003 Lamb St., Attleboro, Mass.

For more details circle 108 on Enclosed Return Postal Card.



ROAD REPAIRS

...are cut to a minimum when you treat gravel roads with Sterling Rock Salt!

Now many highway departments can cut down on spring repairs of gravel roads. Simply by treating these roads with economical Sterling Rock Salt, these departments can reduce surface breakup and aggregate loss. Because salt-treated roads stand up so well through hard winters and heavy traffic, the only maintenance needed in most cases is routine blading in the spring.

Special equipment is no longer required for effective salt treatment of gravel roads. (Any highway department should have the equipment needed.)

Last year, International Salt Company introduced a simple, practical method which is fully described in a free booklet, "Better Roads." Send today for your free copy and learn how Sterling Rock Salt treatment can work in your area.

Service and research are the extras in
STERLING ROCK SALT
INTERNATIONAL SALT COMPANY, INC.

International Salt Company, Inc.
Department RS-6
Scranton 2, Pennsylvania

- ☐ Please send free booklet, *Better Roads*.
☐ Have a Sterling representative call.

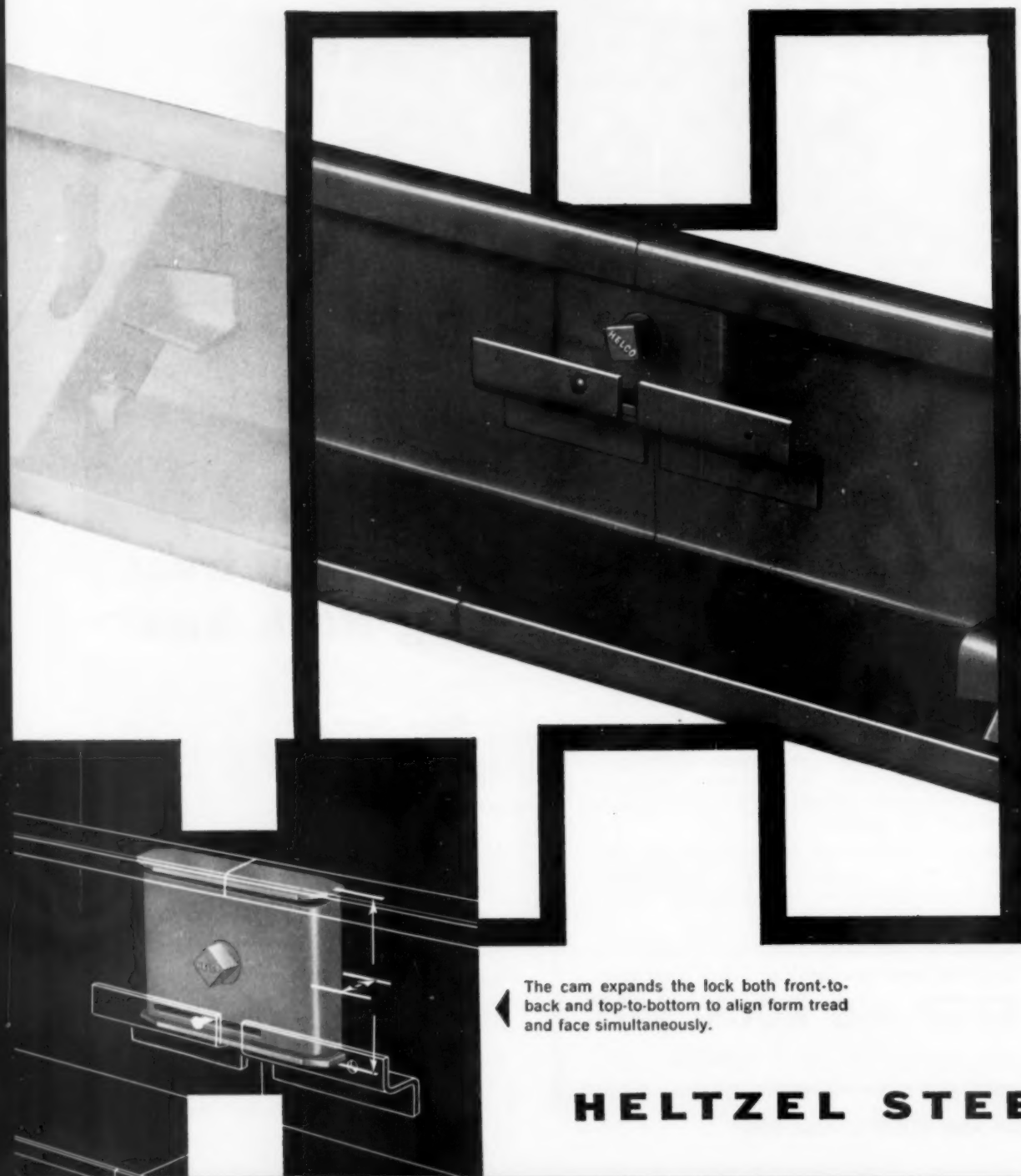
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Address _____

City _____ State _____

... for more details circle 331 on enclosed return postal card

HELTZEL'S NEW **Cam-Lok*



◀ The cam expands the lock both front-to-back and top-to-bottom to align form tread and face simultaneously.

HELTZEL STEEL

STEEL FORMS!

From steel form headquarters—revolutionary new highway forms that go together with absolutely rigid straight-line joints . . . faster, easier than ever before! They're HELTZEL'S NEW *CAM-LOK STEEL FORMS!

Sturdily constructed on a simple cam principle, the new Cam-Lok slides easily into position. A fast quarter turn of the cam draws the treads of both form sections into alignment—with a joint that can't shake loose regardless of the vertical thrust of the machine weight or the horizontal thrust of spreader and finisher. An open end wrench is the only tool needed. There's no sledging with resulting tread and lock damage—no chance for misadjustment, and the simple cam mechanism is positively non-fouling!

There's more to these new Cam-Lok forms. Full channel stake pockets with angular wedges are stronger and insure better stake retention. They're available in the single or double wedge type with or without upturned flange base. Cam-Lok Highway Forms have a cambered base end and are available for radii forming.

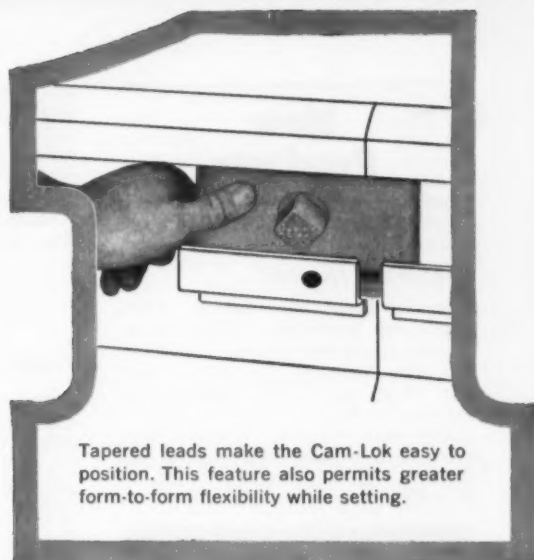
AIRPORT FORMS, too, now come equipped with the fast setting, self-aligning new Cam-Lok. You'll want to know more about this great new idea in highway and airport forms. Write today for your copy of the Heltzel Cam-Lok Bulletin.

* Patent Pending

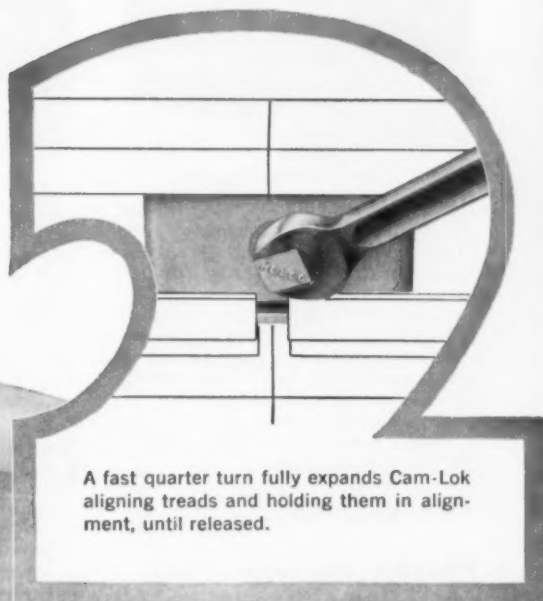


FORM AND IRON COMPANY WARREN, OHIO

. . . for more details circle 329 on enclosed return postal card



Tapered leads make the Cam-Lok easy to position. This feature also permits greater form-to-form flexibility while setting.



A fast quarter turn fully expands Cam-Lok aligning treads and holding them in alignment, until released.

New Products

Highway Mower

Increased versatility for its "Forty Mile" unit has been announced by Topeka Hiway Mower, Inc. The mower can be converted from rubber-tired rear wheels to crawler assemblies in less than an hour.

The rear crawler assemblies give over 400 sq. in. of ground traction and flotation area as compared to 72 sq. in. with regular tires. It is stated that



"Forty Mile" Mower with Crawlers

the crawler assembly's lower center of gravity permits the mowing of steep slopes impossible to mow by conventional means. The greater flotation area is also stated to permit mowing in wet ditch bottoms and in marsh areas impossible to mow by other means.

Non-powered crawler assemblies can also be substituted for the front wheels for mowing or spraying work in extremely difficult marsh areas.

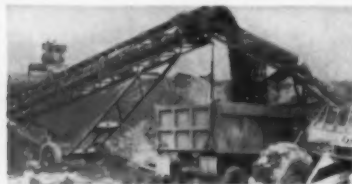
Topeka Hiway Mower, Inc., 623 East 7th St., Topeka, Kans.

For more details circle 109 on Enclosed Return Postal Card.

Portable Screening Plant

A new portable screening plant, Model PS-70, has been announced by Barber-Greene Co. It is available in various sizes to suit requirements.

Consisting of a vibrating screen, belt conveyor, reciprocating feeder, and hopper or trap for feeding, the plant can be towed from job to job as a single unit, without disassembly. The screen is merely folded under the conveyor for travel. A clutch located at the head end of the conveyor controls feeder and conveyor operation, but



Model PS-70 Screening Plant

allows the screen to operate continuously. The newly designed Barber-Greene screen features double-loop spring suspension which allows full vibration with less spring resistance and greatly increases spring life.

Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.

For more details circle 110 on Enclosed Return Postal Card.

Front End Loader

A new loader, L-100 Series, has been added to the line of Henry Manufacturing Co., Inc. This series is designed for mounting on utility tractors and has a breakaway capacity of 2500 lb. Model L-100S has one bucket



L-100 Loader

cylinder and Model L-100D has two cylinder cylinders. Double acting lift and bucket cylinders are standard on both models.

Henry Manufacturing Co., Inc., P. O. Box 521, Topeka, Kans.

For more details circle 111 on Enclosed Return Postal Card.

Small Tractor Imported by Harvester

The "McCormick International B-275", a small 2-3 plow size diesel farm tractor, is a product of the International Harvester Co. of Great Britain, Ltd. and is built at its Bradford, England, works. Rated in the 30 to 35-hp class, it is an addition to Harvester's broad line of farm tractors and does



First of the British-built International Harvester diesel farm tractors to be imported in the U.S.A., being landed at docks in Jacksonville, Florida.

not replace any U.S.-built models. Features are a 4-cylinder IH diesel engine with 35 flywheel hp and 144 cu. in. displacement, eight forward and two reverse speeds, constant running power-take-off, "live" hydraulics, a three-point hitch, disc brakes, a 12-volt electrical system, direct electric starting, and a differential lock.

Although this is the first importation of the IH British-made B-275 tractor into the U.S.A., it is not a newcomer in the Americas; both the B-275 and its predecessor model, the B-250 have been sold in Canada and Latin America as well as in other parts of the world, for the past several years.

International Harvester Export Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 112 on Enclosed Return Postal Card.

Dust Collector

Maximum dust collection efficiency, coupled with high mobility, are claimed for the new Standard cyclonic wet washer for asphalt hot mix plant. It is stated that all known air pollution requirements can be met by this equipment.

Especially designed for use on Stand-



Standard's Cyclonic Wet Washer

ard's new Model S-E "self-erecting" asphalt plant, this mobile unit is ready to operate after connection of an inlet duct from the washer and placement of a light stack extension.

Standard Steel Corporation, 5001 South Boyle, Los Angeles 58, Calif.

For more details circle 113 on Enclosed Return Postal Card.

Rotary Compressor

A new 250 cfm size has been added to the line of "Gyro-Flo" compressors of Ingersoll-Rand Co. It supersedes "Gyro-Flo 210."

The manufacturer states that the "Gyro-Flo 250," with a completely new compressor system, offers nearly 20% more capacity in a unit that is smaller and more compact than its predecessor. It is driven by a larger, more powerful engine, yet retains the same 1800 rpm engine speed. There is a choice of two compressor-matched drives—the new General Motors 4-53 diesel engine or

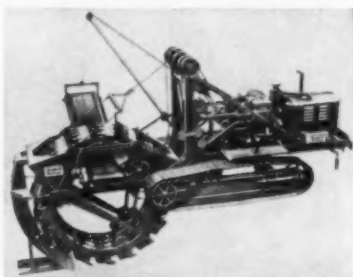
the Continental M-363 gasoline engine. The 250 is available with 2 or 4-wheel mounting, or less running-gear for truck or skid mounting.

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

For more details circle 114 on Enclosed Return Postal Card.

Pipeline Ditcher

A new medium-duty pipeline ditcher, introduced by Gar Wood Industries, Inc., features a torque converter drive and complete hydraulic action. Known as the "Gar Wood-Buckeye 318", the new ditcher digs up to 7 ft. depth, with width of cut up to 44 in. An extra heavy-duty digging wheel has been designed for work in virtually



Gar Wood-Buckeye 318 Ditcher

any digging conditions. Other major features include heavy, tractor-type crawlers; a circulating low pressure hydraulic system, and a high-low traction shift arrangement. All main drives are through transmissions and universal joint drive shafts, there are no open chain drives or jack shafts.

Gar Wood Industries, Inc., Wayne, Mich.

For more details circle 115 on Enclosed Return Postal Card.

Paving Breaker Muffler

A new muffler cover, for pavement breakers, made of two jackets heavily lined with sound-proofing materials is claimed to cut noise 55% or more and



Pavement Breaker Muffler

to increase operator efficiency. The covers take just a few seconds to install, as they are zipped on quickly. They are available for pavement breakers of Thor, Ingersoll-Rand, Joy, Gardner-Denver and Chicago Pneumatic.

W. A. Plummer Manufacturing Co., 8th and San Pedro Sts., Los Angeles, Calif.

For more details circle 116 on Enclosed Return Postal Card.

18-Ton Moto-Crane

A new 18-ton Lorain "Moto-Crane", the MC-218, has been announced by The Thew Shovel Co. It has a new Lorain-designed and built, 180-in. carrier with stronger box-sections, side rails, and rocker arm bogie construction. It is a 43-mph highway speed. Other features are front bumper and outrigger boxes integral with frame,



Lorain "Moto-Crane" MC-218

side-by-side telescopic outrigger beams, straight-line propeller shafts and through-drive for automatic application of engine torque to wheels having traction.

The MC-218 is fully convertible to shovel, crane, clamshell, dragline and hoe. The turntable can be mounted in two positions on the carrier for either maximum crane capacities or for best digging ranges. This position change can be made easily on the job.

The Thew Shovel Co., Lorain, Ohio.

For more details circle 117 on Enclosed Return Postal Card.

Power Broom

A new power broom has been announced by Pfahler Manufacturing Co.



"Ken Roll" Power Broom

It features all steel welded construction and closed differential, left foot-operated clutch and right foot-operated brake, glass sealed ball bearings, plus a wide variety of broom segments for different sweeping jobs. Broom segments are easily replaced. Spring cushion seat provides maximum operator comfort. Broom height is regulated for maximum economy of operation when moving from job to job.

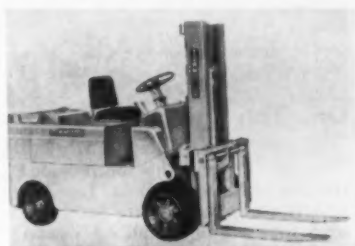
Pfahler Manufacturing Co., Galion, Ohio.

For more details circle 118 on Enclosed Return Postal Card.

Fork Lift Trucks

An improved series of heavy duty fork lift trucks with lifting capacities from 3 to 6 tons was introduced by Towmotor Corporation at the 1959 Material Handling Institute Exposition in Cleveland.

Cushion-tired units include the Model 540 with 6000 to 7000-lb. load-carrying capacity; the Model 600 with 8000 to 9000-lb. capacity; and the Model 670 with 10,000 to 12,000-lb.



Pace-Maker Model 670

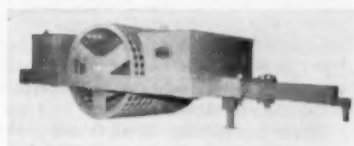
lifting capacity. Pneumatic-tired units include the Towmotor Model 680-P with 6000 to 8000-lb. rated capacity; and the Model 680-P Dual, equipped with dual drive wheels and specially engineered to handle "bulky" 7000-lb. loads with speed and efficiency—particularly in difficult outdoor handling applications.

Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

For more details circle 119 on Enclosed Return Postal Card.

Grate Type Roller

A new and improved grate roller, the '59 model of the Twin "Crusher-Pak", announced by Eskridge Equipment Co., has complete peripheral cutting edges and alternate breaker bars. Baskets are made of high strength heat treated alloy steel. The standard



Grate Roller "Crusher-Pak"

unit includes internal cleaners, removable ballast tanks, rear towing eye, folding leg stands, adjustable draw-bar and universal swivel towing eye.

Eskridge Equipment Co., 1214 South Norwood, Tulsa 12, Okla.

For more details circle 120 on
Enclosed Return Postal Card.

Pneumatic-Tire Roller

A new 9-wheel, 12-ton, self-propelled rubber-tire roller, announced by Galion, has four drive compacting wheels and five steering compacting wheels. The front and rear wheel treads overlap.

The manufacturer points out that with their unitized assembly each tire, wheel and wheel brake is serviceable individually. This is true also of the drive chains, which are completely enclosed but easily accessible. The entire power train can be removed as a unit. The new roller has full oscillating multiple king pins which are designed to reduce inward movement of the front wheels to an absolute minimum.

The Galion Iron Works & Mfg. Co., Galion, O.

For more details circle 121 on
Enclosed Return Postal Card.

One-Ton Roller

A one-ton roller, Model 125—"Smooth Topper" has been added to the line of Littleford Bros., Inc. Among new features claimed are extreme ease of maneuverability and an operator's



Model 125 "Smooth-Topper" Roller

platform, which permits quick access to tools and eliminates the need to climb down, over or through the roller.

Littleford Bros., Inc., 457 E. Pearl St., Cincinnati 2, Ohio.

For more details circle 122 on
Enclosed Return Postal Card.

Portable Bulk Cement Plant

Ross Porta-Plant Company announces introduction of the "Hi-Capacity Model 350-B", bucket elevator type, independent bulk cement batching plant as an addition to its line. It is a highly portable, compact unit with a 350-bbl. capacity, and is adaptable to any situation where bulk cement is desired.



The Ross Portable Cement Silo and
Batch Plant

Designed for legal highway travel, the Model 350-B can be moved easily by any fifth wheel truck. At the job-site, it can be raised into operating position and placed in operation with a minimum of time, manpower, and equipment, according to the manufacturer.

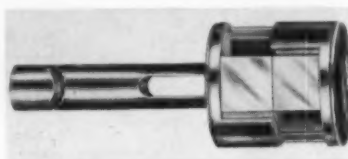
Featured in the design is a self-placing cement hopper which falls into position as the machine is set up, but which rides atop the bulk plant during transportation, thus saving costs. Other features are a chain bucket elevator with a 240-bbl. per hour capacity, an interior self compartment arrangement, a complete system for cement aeration, and a centrally located scale and operational panel for one-man operation. The scale and power section are fully housed for protection against weather and vandalism.

Ross Porta-Plant Co., Box 446, Brownwood, Texas.

For more details circle 123 on
Enclosed Return Postal Card.

Double Right Angle Prism

A new improved double right angle (hand) prism with a slotted handle that enables faster target location is now available from Keuffel & Esser Co. It permits rough sighting of an object even at a steep angle below the ob-



Double Right Angle Prism

server. The new instrument's larger precision ground optics increase field of view and allow faster sightings.

In addition to street, road and highway surveys or plus and offset mapping, the instrument can be used to determine right angles, stake out small areas, line up places for shoring or lay out squares for contouring.

Keuffel & Esser Co., Adams Ave., Third St., Hoboken, N. J.

For more details circle 124 on
Enclosed Return Postal Card.

Concrete Buggy

The new Model 15-B powered buggy with improved controls, announced by the Prime Mover Co., features an all new drive engineered specifically for construction use. The 15-B has $\frac{3}{4}$ ton capacity. The 10-cu. ft. dump bucket



Model 15-B Powered Buggy

latches on the chassis and is quickly interchangeable with a flatbed platform. Powered with a 7-hp air cooled Wisconsin engine, it is stated to easily take 20% inclines fully loaded.

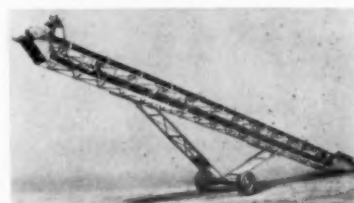
The Prime Mover Co., Muscatine, Ia.

For more details circle 125 on
Enclosed Return Postal Card.

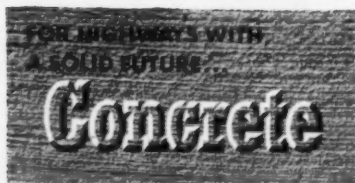
Portable Conveyors

Three entirely new units have been added to Barber-Greene's line of portable belt conveyors. They are available in belt widths of 18, 24, 30 and 36-in., and in lengths from 33 to 60-ft. in 3-ft. increments. These conveyors are offered in three different models, depending upon the type of drive.

Model PA-70 has a torque-arm drive



New Barber-Greene Heavy Duty
Portable Conveyor



On the Ohio Turnpike, they paved with

CONCRETE

saved \$7,181,898
in first cost
alone!

Studies of pavement designs proved in advance that only concrete could give the needed strength at so low a cost. Now records show big maintenance savings, too.

The consulting engineers on the Ohio Turnpike estimated that pavement maintenance for the first five year period would be 2 cents per square yard per year if flexible, dark colored pavement were used — and only 1 cent per square yard per year if rigid concrete pavement were laid. Concrete was chosen for the entire Turnpike!

Twenty million vehicles have travelled it in the first two years, yet

actual maintenance costs to date are only slightly more than *half* the estimated amount!

And maintenance costs will *stay* low. Concrete—because it is rigid—is the only material that has no “moving parts” to cause hidden wear. And only concrete’s load-bearing strength can be figured mathematically to match future traffic—give you an expected 50 years and more of safe, smooth driving.

All good reasons why concrete is the only thrifty way to build high-traffic-volume highways like those for the Interstate System.



Concrete's high reflectance saves as much as \$40,000 a year in lighting costs for an average 10-mile expressway. Only half as many light fixtures are needed.

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

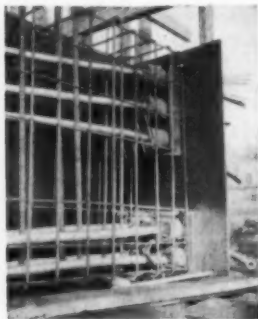


South Fork Bridge over South Fork of Holston River, Kingsport, Tenn. Owner: Ridgefields, Incorporated. Contractor: Blount Bros. Construction Company, Montgomery, Ala. Consulting Engineer: Mr. H. T. Spoden.

450-Ft. Prestressed Concrete Vehicular Bridge Uses 53 Miles of Roebling Prestressing Wire



Grouting 90-foot girders.



Detail of end reinforcement cage, Freyssinet end anchorages, metal sheath and Roebling wire—90-foot girder.

Spanning the South Fork of the Holston River at Kingsport, Tennessee, this new bridge embodies the Freyssinet cable method of prestressing. These Freyssinet cables—as well as end anchorages, sleeves, grids, and jacking and grouting equipment—were supplied by the Intercontinental Equipment Company, Inc.

Span lengths are 85, 90, 100, 90 and 85 feet, for a total length of 450 feet. Roadway width is 20 feet between curbs. Prestressing units consist of 8 cables of 18 wires each in the 100-foot span, and 7 cables of 18 wires each in the 85- and 90-foot spans. Wire diameter is 0.196 inches.

Roebling is now equipped to deliver cable assemblies composed of a specified number of wires cut to the required length and assembled in flexible metal hose ready for placement in the forms of post-tensioned members.

This facility is, of course, in addition to the standard 7-wire, stress-relieved strand for pre-tensioned bonded prestressed concrete and galvanized strand assemblies for structures where design loads are heavy or require long tensioning elements, and stress-relieved wire for all types of parallel wire cables for post-tensioning.

Further, Roebling is always ready to furnish you with information and assistance on *any* phase of this remarkable and widely growing construction method. By writing to Construction Materials Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, you can avail yourself of prestressed concrete information on whatever aspect most concerns you.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



... for more details circle 352 on enclosed return postal card

New Products

powered by an electric motor, which is mounted overhead at the head end of the conveyor, making long V-belts, chains, or lineshafting unnecessary.

Model PB-70 has a V-belt and countershaft drive powered by a gasoline engine. Power is transmitted from the engine to the first and second countershafts by V-belts, and from the second countershaft to the head shaft by roller chain. Engine is mounted near the foot end by conveyor.

Model PC-70 has a lineshaft drive powered by a gasoline engine. Power is transmitted by short V-belts from the engine to a reducer located inside the conveyor truss, then through lineshafting to another reducer at the head end. Final drive to the headshaft is through roller chain.

Barber-Greene Co., 400 N. Highland Avenue, Aurora, Ill.

For more details circle 126 on Enclosed Return Postal Card.

Digital Computer

Bendix Aviation Corp. announces its G-15 General Purpose Digital Computer as especially adaptable to use in the following branches of civil engineering and hydrology—Highway construction and design, Photogrammetry, Sewer design based on rain run-off calculations, Truss analysis, Structural analysis and design, Surveying, Traffic analysis, Backwater analysis, Correlation of factors of stream flow and reservoir storage in a hydroelectric system, Dam design, Power generation, Reservoir design for maximum power output, Spillway flood routing.

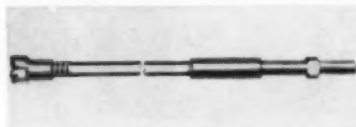
It is advertised as a small size, medium speed machine, available at a remarkably low price either on purchase or on a rental basis.

Bendix Computer Division of Bendix Aviation Corporation, Los Angeles 45, Calif.

For more details circle 127 on Enclosed Return Postal Card.

Rock Bits

A complete line of rope thread, carbide "Rok-Bits"; "Carbo-Rok" sectional rods; couplings, and striking bars is offered by Brunner & Lay. The easily uncoupled bits come in 2½-in., 2¾-



Rope Thread "Rok-Bit"

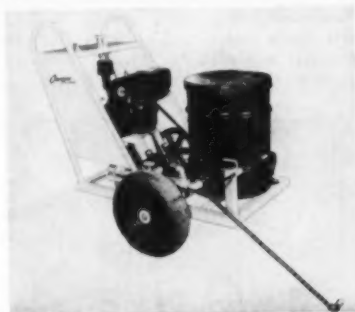
in., 3-in., 3½-in., and 4-in. bit sizes with 1½-in. rope thread; 3-in., 3½-in., and 4-in. with 1¾-in. rope thread; also 4-in., 4½-in. and 5-in. with 2-in. rope thread. All are available in both cross and X design with a new heavy duty, cutaway body. The "Carbo-Rok" sectional rods are available with rope threads on 1¼-in. Hex, 1½-in. Hex, 1½-in. Rd., 1¾-in. Rd. and 2-in. Rd. steel.

Brunner & Lay Inc., 9300 West King Rd., Franklin Park, Ill.

For more details circle 128 on Enclosed Return Postal Card.

Spraying Machine

A new portable spraying machine, designed to apply concrete curing membrane has been developed by Champion Manufacturing Co., for use in conjunction with a large sprayer in areas where the large sprayer cannot operate. It also can be used in oiling



New Champion Spraying Machine

concrete forms before use.

The unit comes equipped with attachments for various kinds of spraying. It has a 15-gal tank and is powered by a 2¼-hp Briggs-Stratton engine.

Champion Manufacturing Co., 3700 Forest Park Ave., St. Louis 8, Mo.

For more details circle 129 on Enclosed Return Postal Card.

Improved Structural Bolt

A high strength structural bolt which is said to combine the tensile strength of a hex head high strength bolt with the bearing of a rivet, and to have the highest shear strength and greatest resistance to slip of all structural bolts, is announced by The Lamson & Sessions Co.

The bolt's shank is made with specially formed knurls. Length of the knurled body is determined by thickness of the members to be joined. When the bolt is driven or pulled into place, the knurls produce a body-bound fit. No head washers are necessary.

Three special design features make these bolts easy to drive or pull into position: (1) frontal shape of each knurl is a section of a small ball; (2) back face is relieved somewhat like a



New High Strength Bolt

drill or tap to prevent packing of displaced material; (3) knurls are set on a spiral to reduce driving force. An engineering bulletin is available from the manufacturer.

The Lamson & Sessions Co., 5000 Tiedeman Road, Cleveland 9, Ohio.

For more details circle 130 on Enclosed Return Postal Card.

Tractor Shoes

New track shoes developed for use on International T D-241 tractors are claimed to have resulted in a 51% increase in beam, or bending strength. This shoe is the result of a blending of new material, a heavier grouser and a revised heat treating pattern. The grouser is 5/8-in. thick at the tip and three and 3/16-in. at the base.

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Ill.

For more details circle 131 on Enclosed Return Postal Card.

Heavy-Duty Sinker Drill

A new heavy-duty sinker drill, developed by Chicago Pneumatic, combines the "Beavertail" retainer with an all-new front assembly. The new CP-



CP-69 Sinker Drill (Inset shows the "Beavertail" in Open Position)

69 is stated to be the first drill in the 55-lb. class to use the "Beavertail" design. Key element in the assembly is a compressible rubber cushion which has eliminated retainer springs. Another feature of the CP-69 is an all-new front head assembly in which vital chuck parts have been redesigned and safely enclosed within a protective, one-piece sleeve.

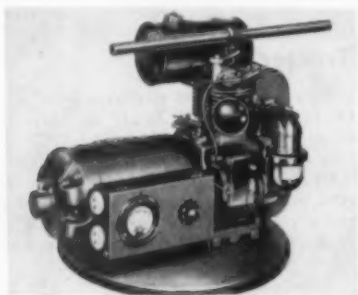
Chicago Pneumatic Tool Co., Chicago Pneumatic Building, New York, N. Y.

For more details circle 132 on Enclosed Return Postal Card.

2500-Watt Generator

A new heavy duty 2500-Watt D.C. portable generator, announced by Master Vibrator Co., was designed for extra long life under the roughest conditions, and is recommended especially for construction operations.

A 6-hp 4-cycle Wisconsin engine is direct connected to the compound



Master 2500-Watt Generator

wound generator. The unit is available in either 115 or 230-volt models—13 amps at 115 volts, 6.5 amps at 230 volts. It is rated at 2500 watts intermittent duty and 1500 watts continuous duty—enough power to operate almost any hand power tool or circular saw up to 8 1/4-in. diameter.

Master Vibrator Co., 266 Stanley Ave., Dayton 1, Ohio.

For more details circle 133 on Enclosed Return Postal Card.

Tractor Shovel

A new model H-120 has been added to the line of rubber-tired, four-wheel-drive "Payloaders" tractor shovels of



Model H-120 "Payloader"

The Frank G. Hough Co. The unit has a maximum height of raised bucket of 19 ft. 2 1/2 in. with clearance to center of hinge pin, 14 ft. 7 1/2 in. With the bucket dumped at 50°, clearance under the bucket edge is 10 ft. 10 in. and the forward reach from the front tire is 3 ft. 6 in.

The Model H-120 is powered by a turbo-charged Cummins NRT-6BI diesel engine, with other engines optional. The manufacturer's recommended load "carry capacity" is conservatively rated at 12,000 lb. Buckets from 2 to 6 cu. yd. are offered for handling various materials.

The Frank G. Hough Co., 984 Seventh St., Libertyville, Ill.

For more details circle 134 on Enclosed Return Postal Card.

Hopper Car Vibrator

The recently improved Syntron "unbalanced-motor" vibrating car shaker is claimed to empty railroad hopper cars containing sand, gravel, or rock ten times faster and cheaper than by manual methods.

The shaker is designed with a



Syntron Vibratory Car Shaker

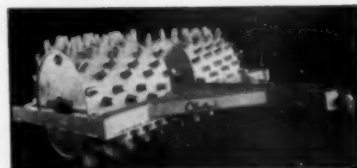
powerful, electromechanical vibrator mounted on a hook-type steel frame for applying to the side of the car. The 4-hp. motor produces 850 vibrations per minute from 230 or 460 volt, 3-phase, 60 cycle current.

Syntron Co., 384 Lexington Avenue, Homer City, Pa.

For more details circle 135 on Enclosed Return Postal Card.

Tamping Roller

A new Model 6060 tamping roller, announced by Chester Products, Inc., has new design features including flat-cone feet, wedge-spade cleaner base, and short-turn frame. The roller has a drum diameter of 60 in. and width of 60 in., with 120 feet per drum. The cone-type feet of forged steel are flat-ended with a bearing surface of 7 sq. in. per foot. The wedge-spade type



Model 6060 Tamping Roller

cleaner bars are standard front and rear and are constructed of square bar steel angled to conform with drum surfaces in an effective cleaning position.

Chester Products, Inc., Belle Ave., and B and O. RR., Hamilton, Ohio

For more details circle 136 on Enclosed Return Postal Card.

Shoulder Spreader

The new ULMac U-500 Shoulder spreader, announced by ULMac Equipment Co., attaches quickly and easily to any Caterpillar No. 12 or No. 112 motor grader.

It is stated that spreads to 12 feet can be made easily and accurately with any spreadable material including hot mix. A new, scientifically curved blade for "live rolling action", mixes and



ULMac U-500 Shoulder Spreader

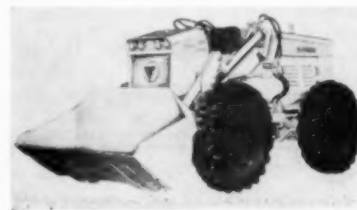
rolls material out, minimizing segregation and reducing side draft. The blade is made up in three sections, allowing full variation of spread width to 12 feet. Wider spread arrangements are available on request. It is stated that depth of spreads can be adjusted from 6" above to 18" below pavement level.

ULMac Equipment Co., El Paso, Ill.

For more details circle 137 on Enclosed Return Postal Card.

Front End Loader

The new TL-14 "Tracto-Loader", announced by Tractomotive Corporation, has special features designed for speeding excavating-loading work and for easy operation. The 14,480-lb. unit has a carry capacity of 5300 lb., maximum lifting capacity of 11,000 lb. and



TL-14 "Tracto-Loader"

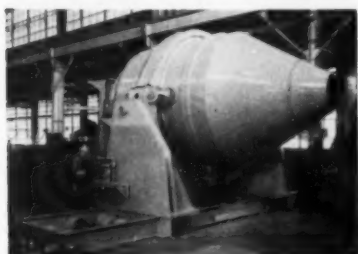
a breakout force of up to 17,800 lb. Six buckets are available ranging in size from 1 to 3 cu. yd. Maximum dumping clearance under the hinge pin is 10 ft. 5 in. Depending upon the bucket used, dumping clearance under the bucket cutting edge ranges from 8 ft. 3 in. to 8 ft. 5½". The unit is powered by either an 86-hp, 6-cylinder Allis-Chalmers gasoline engine or an 81.5-hp Allis-Chalmers diesel engine.

Tractomotive Corporation, Deerfield, Ohio

For more details circle 138 on
Enclosed Return Postal Card.

Big Mixer

What is believed to be the world's largest tilting mixer has been completed by T. L. Smith Company of Milwaukee, Wisc., and Lufkin, Texas. Although this 10-cu. yd. capacity model weighs over 53,000 lb., it will be installed in a portable batching plant of



Smith's 10-yard Tilting Mixer

the Replogle Construction Co. of Circleville, Ohio. Three similar tilters are now under construction at T. L. Smith for Langenfelder & Sons of Baltimore, Maryland. They will be used in the construction of the new International Airport in Washington, D. C.

T. L. Smith Co., 2843 No. 32nd St., Milwaukee, Wis.

For more details circle 139 on
Enclosed Return Postal Card.

Belt Conveyors

The Barber-Greene "Redi-Fab" belt conveyor series has been expanded to fit even more jobs. Beside increased lengths, the new series offers faster selection, a superior new drive unit, and a more complete assortment of accessories. Lengths in the new series range from 18 to 240 ft., and capacities to 480 tons per hour. Belt widths are



Barber-Greene "Redi-Fab" Belt
Conveyor

18, 24 and 30 in.

The complete "Redi-Fab" Series includes head ends, drives, tail ends, truss sections, troughing carriers and return rolls, and belting. Accessories include backstops, swivel spouts, belt scrapers, fixed and adjustable A-frames, walkway supports, tail end and intermediate anchors, belt housing, belt retainers, and grease pipe extensions.

Barber-Greene Co., Aurora, Ill.

For more details circle 140 on
Enclosed Return Postal Card.

Blast Hole Drill

A new medium-sized heavy-duty rotary blast hole drill—the Model 30-R—has been introduced by Bucyrus-Erie Co. It will drill 6¼ to 7⅞ diameter holes.

The new drill is available either on crawler (30-RC) or truck mounting (30-RS), or on truck mounting with power takeoff from truck engine (30-RP). Down-the-hole tools are available for all three units. The 30-RS



Bucyrus-Erie 30-RC Drill

and 30-RP also can drill medium diameter water wells to a depth of 1,000 ft.

A pipe rack that holds five lengths of 21-ft. 3-in. long pipe makes the 30-RC a self-contained unit for drilling to 106 ft.

Power units available for the 30-RC are a caterpillar D 318 GT turbo-charged 4-cycle diesel or GMC 6-7 2-cycle diesel.

Drill Division, Bucyrus-Erie Co., Richmond, Ind.

For more details circle 141 on
Enclosed Return Postal Card.

Compression Tester

A new 350,000-lb. capacity compression machine, Model LT-701, announced by Forney's Incorporated, is designed specifically for use in laboratories having a steady work load of routine concrete compression tests.

Standard equipment includes complete upper platen assemblies for cyl-



Model LT-701 Compression Machine

inders and blocks, a 16-in. diameter load indicator, automatic limit switch, illuminated instrument panel and work table, a built-in monitor gage for checking the load indicator, and a hardened wear plate to protect the lower platen.

Forney's Incorporated, Tester Division, Box 310, New Castle, Pa.

For more details circle 142 on
Enclosed Return Postal Card.

Pneumatic Tired Roller

A new model pneumatic tired roller having ground pressures exceeding truck load limits is announced by Tampo Manufacturing Co. Specifically designed for maximum density rolling of asphalt mats and all finish surfaces, this new Model SP-900 features 85 lb. per square inch of compaction effort



Tampo Model SP-900

to meet latest specification requirements.

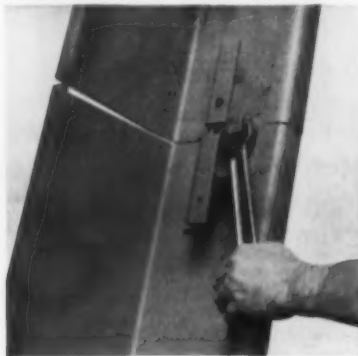
Specifications include a rolling width of 64 in., tire inflation pressures to 100 psi, six speeds in both forward and reverse, and torque converter, automatic power reverse control.

Tampo Manufacturing Co., Inc., P.O. Box 4248, Station A., San Antonio 7, Texas.

For more details circle 143 on
Enclosed Return Postal Card.

Highway Forms

The new cam-lok road form, announced by Heltzel, is stated to embody a superior new cam locking principle which eliminates sledging and permits faster, easier form setting, since a simple quarter turn of the cam draws treads and faces of both form sections into alignment. The resulting joint can't shake loose, regardless of the vertical stress imparted by weight of machines or the horizontal thrust



Heltzel Cam-Lok Highway Form

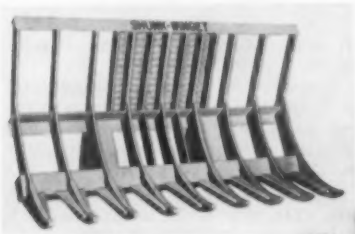
of spreaders and finishers. Heltzel forms are constructed of 1/4-in. Helco steel plate. The channel stake pockets are welded to the form to provide maximum support. The cam casing is formed from 3/16-in. rolled steel plate and rides in a heavy Z-bar slide. A retainer pin prevents accidental loss of lock. The locking cam is a heavy integral casting with a 1-in. square stud.

The Heltzel Steel Form and Iron Co., Warren, O.

For more details circle 144 on
Enclosed Return Postal Card.

Brush Rake Attachment

A new rake attachment for rubber-tired or crawler-type front end loaders, offered by Shunk Manufacturing Co., not only roots out trees and brush but carries them away and piles them as high as 8 ft. for disposal. This unit known as the "Shunk-Winget" bucket-type brush rake, is interchangeable with the loader's bucket, and is designed to speed land clearing jobs by "raking" out brush, hedge-rows and trees with minimum displacement of



"Shunk-Winget" Brush Rake Attachment

soil. Teeth on the rake are of heavy Jaloy No. 3 steel for exceptional wear resistance. All joints, including ribs, backplates, bridging, and gusset reinforcement points, are seam-welded into a solid unit built to stand up under extremely hard service.

Shunk Manufacturing Co., Bucyrus, Ohio

For more details circle 145 on
Enclosed Return Postal Card.

Hard-Facing Electrode

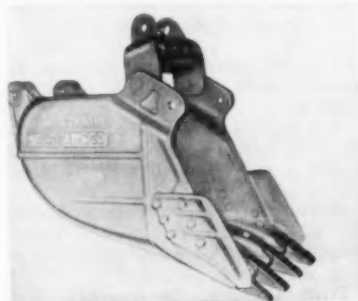
After 1 1/2 years of extensive field testing Stoodly Co. is now marketing Stoodly 2134, a high alloy hard-facing electrode with high resistance to extreme abrasion, medium impact and high compressive loads. This material is stated to have proven most successful on all types of earth-working equipment such as shovel buckets and teeth, crushers, and other parts subject to the severest types of destructive wear. Field experience is stated to indicate that Stoodly 2134 may be expected to provide service life surpassed only by the tungsten carbides.

Stoodly Company, Whittier, Calif.

For more details circle 146 on
Enclosed Return Postal Card.

Backhoe Bucket

New one-piece cast manganese steel backhoe buckets equipped with a cast attachment arch and "Simplex" two-part teeth are available from Amsco Division. The arch is cast with a box cross-section to provide greater strength. It is made integral with the main bucket casting by means of shear



3/4 yd. Amsco Backhoe Bucket

plugs and fillet welding, and inset so that there is no possibility of binding in trench work. The 3/4-yd. bucket shown is built for service on a Bucyrus Erie 22B and is available, through 1 1/2 yd. size, for other machines requiring an arch attachment.

American Manganese Steel Division,
389 East 14th St., Chicago Heights, Ill.

For more details circle 147 on
Enclosed Return Postal Card.

To Speed Car Unloading

The new "Navco HCP" line of heavy-duty air vibrators for unloading covered railroad hopper cars has just been announced. These vibrators are designed with an exceptionally long piston stroke for maximum amplitude and thrust. The piston is the only moving part. They have stainless steel mounting head for long life, and no body assembly bolts to wear out or fatigue. They are stated to avoid the tendency to jam in the mounting bracket, thus cutting vibrator action.



The "Navco HCP" Air Vibrator

According to the manufacturer, these units cut unloading time on covered hopper cars and eliminate "clean-out" of cars after emptying. They are also said to be used successfully on bulk trailers carrying potash, cement, and similar materials.

Two models are available. The 3-inch piston size is 14 1/4 in. long, weighs 68 lb. and consumes 18 cfm at a recommended air pressure of 40-60 psi. The 4-inch size is 17 1/2" long, weighs 115 lb., and consumes 29 cfm. A hydraulic clamp assembly is also available for attaching to cars not equipped with standard dovetail brackets.

National Air Vibrator Co., 435 Literary Ave., Cleveland 13, Ohio

For more details circle 148 on
Enclosed Return Postal Card.

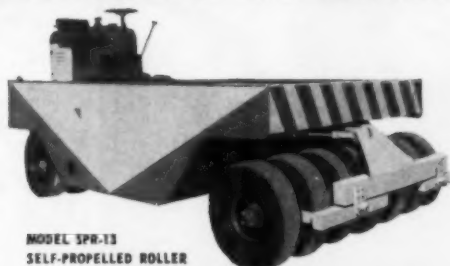
Improved English Crusher

Outstanding feature of the latest addition to the "Rollsizer" range of roller bearing crushing rolls made by the Frederick Parker engineers, England, is a small but sturdy, hand-operated hydraulic pump for spring tension adjustment.

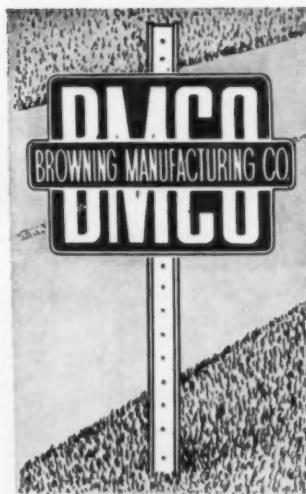
The new model "Rollsizer"—size 30 in. x 24 in. (76cm x 61cm) is the largest, and is reported to have outputs of 32 to 75 tons an hour. It has been introduced to meet the surge in demand for stone crushed to minus 3/4"

(Continued on page 151)

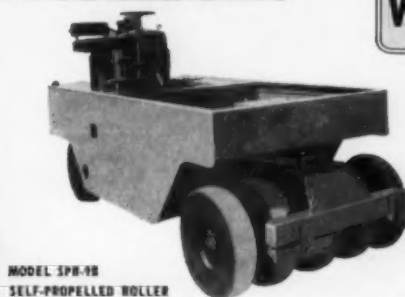
Most direct route to profitable contracts



MODEL SPR-13
SELF-PROPELLED ROLLER



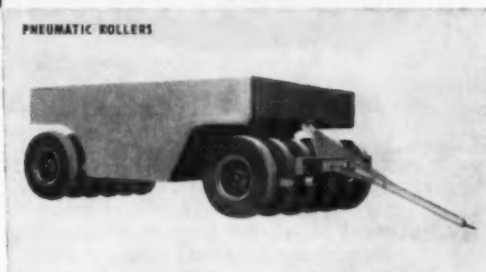
MODEL 109 SPREADER



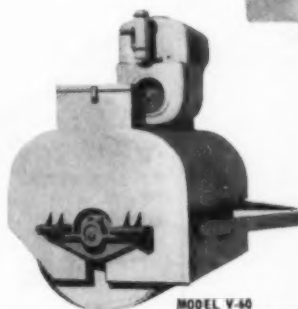
MODEL SPR-18
SELF-PROPELLED ROLLER



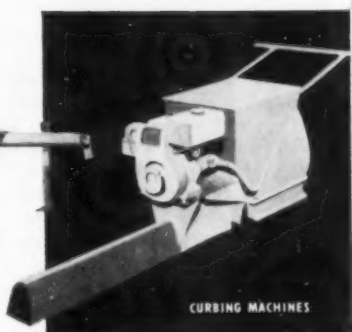
MODEL HP-4 COMPACTOR



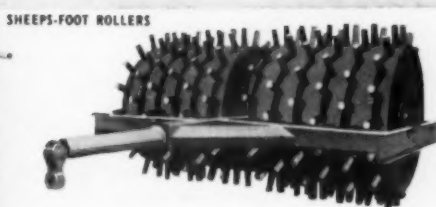
PNEUMATIC ROLLERS



MODEL V-40
VIBRATING ROLLER



CURBING MACHINES



SHEEPS-FOOT ROLLERS

BROWNING MANUFACTURING CO.

111 Humble Ave. • P. O. Box 2707 • San Antonio 6, Texas

This year, be sure to investigate before you invest in any new equipment. The durability, low operating costs and dependability of all BMCO units have made them the rugged favorites of contractors across the nation. Go the BMCO route and be miles and money ahead in 1959.

... for more details circle 287 on enclosed return postal card

REPLACES **4 TO 7** MACHINES



PETTIBONE

**180°
SPEED
SWING**

ALL-PURPOSE MATERIAL HANDLER

NOW—the *all-purpose* material handler that gives you one-man crew advantages. It's the soundest investment of all for your requirements because it does *all* the jobs . . . earns its way on one application after another. And its usefulness is multiplied to the extent that it replaces single-purpose, specialized equipment!

The best features of all material handling machines are combined in the Pettibone Speed Swing, plus the *exclusive* 180° boom swing—90° left or right—to make it the most efficient, *most versatile* all-purpose material handler in the field.

Example: shown above, the Speed Swing backfills a sewer trench. The

180° boom swing permits it to work parallel to the trench in a confined area with no gee-hawing or maneuvering of the machine. Traffic is not disrupted . . . can move safely in other lanes. Other applications are numerous: park and street maintenance, tree removal, culvert installations, loading and spreading materials with high speed operation, loading out old curbing and sidewalks, snow removal—to mention a few. And all on a cost-cutting operation basis. Shown at right, 10 quickly interchangeable attachments (by changing *only* 3 pins) that make the Speed Swing the *most adaptable*, *most versatile* all-purpose material handler of all!

Get the facts on how the Pettibone 180° Speed Swing can reduce your equipment investment, as well as your maintenance costs.

PETTIBONE MULLIKEN CORPORATION

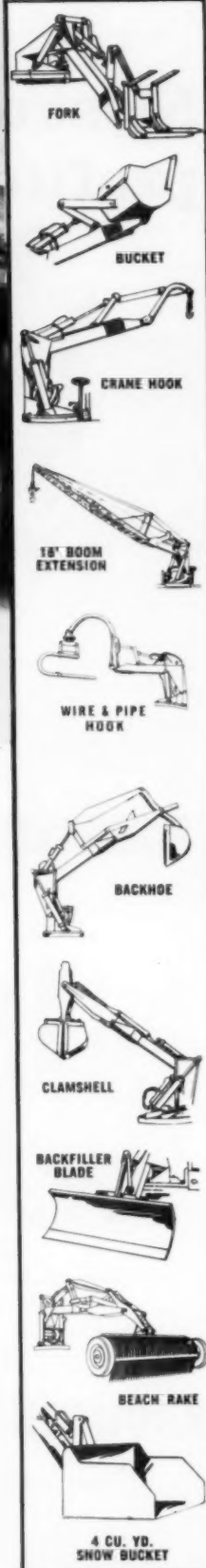
4700 W. DIVISION ST.

CHICAGO 51, ILLINOIS

SPaulding 2-9300

. . . for more details circle 368 on enclosed return postal card

150



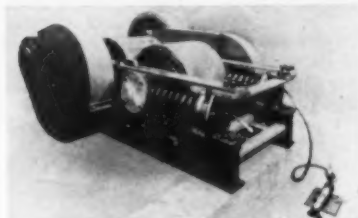
ROADS AND STREETS, June, 1959

New Products

(Continued from page 148)

in., although it is adjustable to produce smaller or larger sizes.

Roll shells, either plain or serrated, are designed so that welding can be done without removing them from the machine, and without any dismantling. Instructions on the rebuilding and hardfacing of crushing roll shells by welding are given in detail in a booklet—TP/264.



The New Parker "Rollsizer" Crusher, showing Hand-Operated Hydraulic Pump.

Other "Rollsizers" which produce large outputs of aggregate of 1/2 in. and smaller, include an 18 in. x 14 in. model with outputs of 16 to 30 tons an hour, and a 24 in. x 16 in. model with outputs of 20 to 36 tons.

Frederick Parker, Limited, Catherine Street (Extension), Leicester, England.

In Canada—Frederick Parker Ltd., 90 Eglinton Avenue E, Toronto 12, Ontario.

For more details circle 149 on Enclosed Return Postal Card.

42-Yard Stripping Shovel

Sale of a model 1050B, 42-cu. yd., coal stripping shovel has been announced by Bucyrus-Erie Co., South Milwaukee, Wisc. It is being built for the Green Coal Co., Owensboro, Ky., for delivery in September. One of Bucyrus-Erie's largest units, the 1050-B weighs approximately 3 million



A Bucyrus Erie 1050B at Work

pounds. Green Coal Company's unit will dig more than 60 tons of earth and rock in a single bite and cast it 120 ft. Cost of this shovel is given as well in excess of one million dollars.

Bucyrus-Erie Co., So. Milwaukee, Wis.

For more details circle 150 on Enclosed Return Postal Card.

Off-Road Trucks

The "Haulpak" line of off-road haulers, announced by LeTourneau-Westinghouse, features air suspension, no springs, low center of gravity, and fast travel speeds. The truck is available in three sizes: 27-ton and 32-ton end dump models, and an 80-ton bottom dump.

All three units are powered by Cum-



New "Haulpak" Truck

mins engines, the respective ratings being 335, 375, and 450 hp. The 80-ton unit operates at speeds up to 40 mph. All three have torque converters which provide 4 forward ranges and 2 reverse. They incorporate automatic lock-up to eliminate torque converter slip and utilize maximum engine speed for higher truck speed.

LeTourneau-Westinghouse Co., Peoria, Illinois

For more details circle 151 on Enclosed Return Postal Card.

New Earthwork Slide Rule

Computation of grading quantities in one fourth the time required by average end area calculations from planimeter measurements is claimed for the recently developed "Avol" slide rule. Another report states the saving as about six man-hours of labor per mile. The rule is also useable for computing overhaul and other items.

The foregoing comparison with end area calculations is from one of the State Highway Departments that has tried the rule experimentally. A consulting engineer reports that it is slightly more accurate than a carefully operated planimeter.

Engineering and Marketing Associates, Inc., Lobby E—Terminal Sales Bldg., Portland 5, Oregon.

For more details circle 152 on Enclosed Return Postal Card.

High Intensity Flashers

A line of high intensity warning flashers said to embody for the first time a neon gas tube successfully combined with transistors (Pat. applied for) has been introduced by Northern Signal Company.

Duration of flash is approximately 90 milliseconds. The system is reported as highly reliable and efficient. Model 5912-T7 (pictured) has 7-in. diameter lenses protected by a 3/16-in. wire guard.



Northern Signal's New Neon Flasher

Case holds 12 volt "hot-shot" type dry battery. Battery life approximately 5 weeks of continuous operation. The generator unit is hermetically sealed and practically damage proof.

The purpose of this line of flashers is to provide the maximum warning impact possible from a 12 volt "hot-shot" dry battery, consistent with reasonable battery life.

Northern Signal Company, Inc., Saukville, Wisc.

For more details circle 153 on Enclosed Return Postal Card.

Pavement Marker

An advance in permanent-type reflectorized plastic pavement marking has been announced by Primo Safety Corporation. The new product, "Plastic 'SD,'" is coated at the factory with a newly developed adhesive backing that makes application simply a matter of placing it on the pavement, and applying light foot or roller pressure.

In addition to the adhesive coating, which develops a balanced tensile strength immediately on application, the reflectorized plastic incorporates a completely new process that has high chipping resistance, excellent plastic cold-flow characteristics, and ability to react itself to pavement contour in event of pavement fault.

Primo Safety Corporation, Huntingdon, Pa.

For more details circle 154 on Enclosed Return Postal Card.

¾-yd. Shovel-Crane

A new ¾-yd. (12½ to 30-ton capacity) LS-78, announced by Link-Belt Speeder Corporation, is completely new from base to boom. The machine has "Speed-O-Matic" hydraulic controls. Main friction clutches are all 2-shoe, internal-expanding and completely interchangeable. With variable pressure control valves, the operator can meter the hydraulic pressure to each clutch in amounts varying from a



New ¾ yd. Link-Belt Speeder Shovel

few pounds up to the full 900 to 1050 psi range. Machinery layout of the upper works is basically the same as that found on all Link-Belt Speeder models up through the 40-ton "108" series.

Three lowers are available, varying in gauge from 7 ft. 10 in. to 9 ft. 8 in. and in length from 11 ft. 4 in. to 13 ft. 7 in. Shoe widths are from 24 in. to 42 in.

Link-Belt Speeder Corporation, 1201 Sixth St., S.W., Cedar Rapids, Iowa.

For more details circle 155 on
Enclosed Return Postal Card.

New Caterpillar Tractor

A new tractor, featuring greater power, decreased maintenance, and higher lugging ability, has been announced by Caterpillar Tractor Co. It is designated the D7 Series D. The engine is turbo-charged, developing 140-flywheel horsepower, an increase of more than 9% over the 128 rating of its predecessor. Drawbar horsepower has been increased from 102 to 112.

Contributing to the substantially increased lugging ability is the higher torque rise of the engine. The tractor offers 19.6% increase in drawbar pull as the engine lugs down under load, which is 80% greater lugging ability than the previous model—the highest



Caterpillar D7 Series D Tractor

in the D7 class. The tractor has lifetime-lubricated rollers, dry-type air cleaner, and power train refinements.

Caterpillar Tractor Co., Peoria, Ill.

For more details circle 171 on
Enclosed Return Postal Card.

Ripper Improvements

The Cat No. 9 ripper has been made stronger and more efficient, according to an announcement of Caterpillar Tractor Co. These improvements result from the use of a new 5-position clevis and 4-hole shank. The clevis, increased 33% in weight, is made from steel over twice as strong as that used in the former unit.

The combination of new shank and clevis provides close control of ripping angle and depth. These two new components allow the machine operator three ripper positions when the tooth is in its low position, and two positions when in its high position. A sixth position is available for carrying.

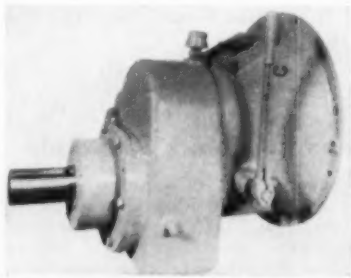
Caterpillar Tractor Co., Peoria, Ill.

For more details circle 156 on
Enclosed Return Postal Card.

Reduction Gear

A new heavy-duty reduction gear for construction, mining and industrial fields is announced by Cotta Transmissions Co. Transmission ratios available with the new Model SR-700 range from 1.43:1 to 2.00:1 inclusive for either engine rotation or anti-engine rotation.

Maximum input torque is 650 ft-lb with maximum input speed permissible



Model SR-700 Heavy-Duty Reduction Gear

up to 2200 rpm. These transmissions are stated to permit modern high-speed diesel engines to be operated at their most efficient speed, and equipment being driven to be used at its proper rate of speed without undue strain or damage.

Cotta Transmission Co., Rockford, Ill.

For more details circle 157 on
Enclosed Return Postal Card.

360-HP Scraper

A new model B "Tournapull" has been announced by Le Tourneau-Westinghouse Co. The engine—the 360-hp, six cylinder, two-cycle diesel, GM 6-110T, is available in combination with either the special Allison torque-converter transmission, or the newly offered step gear transmission. It has a turbo-charger that was not previously available for the two-cycle engine in the "B" Tournapull.

This new engine gives a greater power output. Company officials point out that the other optional 335-hp engines in the Model "B" are still available for normal, average conditions, and that the new 360-hp unit is for those conditions requiring more power.

The B "Fullpack" scraper remains at its capacity of 21 cu. yd. struck and 28 cu. yd. heaped.

Le Tourneau-Westinghouse Co., 2301 NE Adams St., Peoria, Ill.

For more details circle 158 on
Enclosed Return Postal Card.

Aerial Platform

A new improved model of the Industrial Monkey has been announced by IM Division, The Peters Co. The new model, mounted on a 16,000 lb. or heavier truck chassis, is completely maneuverable, ranging from straight-out to straight-up and features a 270 degree turning radius without moving



New Model Industrial Monkey

the truck. Average working height is 48 ft. with all movements controlled by electrically-actuated solenoid valves and double-acting hydraulic cylinders. Dual controls and fully insulated working platforms are standard equipment on all models.

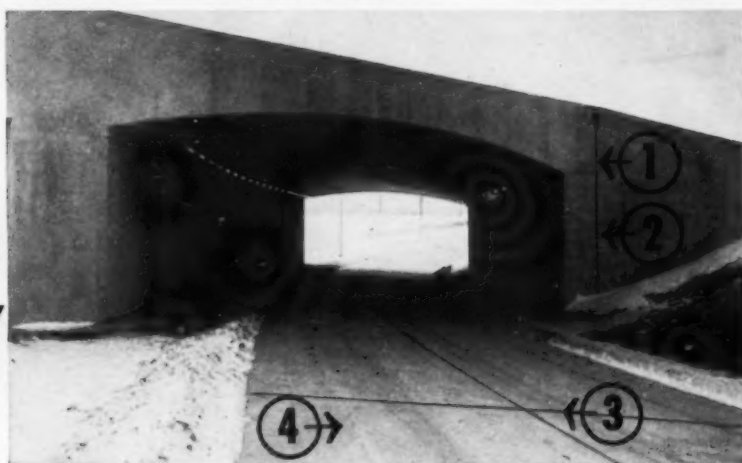
A. M. Division, The Peters Co., 1933 S. E. Union Ave., Portland 14, Oregon.

For more details circle 159 on
Enclosed Return Postal Card.

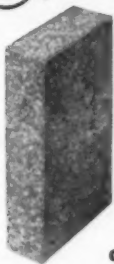
SERVICISED PRODUCTS...[®]



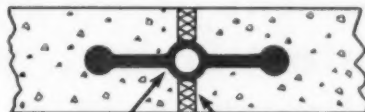
on the ILLINOIS TOLLWAY



① → SELF EXPANDING CORK...



the specially treated premolded joint filler capable of expanding as much as 50% beyond original thickness, was used to keep joints filled at all times, preventing entry of foreign material or driven rain water into joint spaces.



CENTERBULB DUMBBELL WATERSTOP

SELF-EXPANDING CORK

② → SERVICISED RUBBER WATERSTOP...

in both Flat and Centerbulb Dumbbell designs was used in construction and expansion joints in bridge structures, retaining walls and abutments to insure water-tight joints.



③ → HOT POURED PARA-PLASTIC®...

Pavement joints sealed with Para-Plastic remain sealed under wide temperature variations and high speed traffic... insure maintenance-free highway use. Para-Plastic is a rubberized asphalt compound that forms a resilient, adhesive and effective plastic seal.

④ → WHITE PIGMENTED CURING COMPOUND...

Servicised membrane-forming White Pigmented Curing Compound, applied on freshly finished concrete pavement surfaces insured proper curing and produced high strength pavement.

Write for the Servicised Products Catalog

SERVICISED PRODUCTS CORPORATION

6051 WEST 65th STREET • CHICAGO 38, ILLINOIS



Yours only with the

OLIVER

OC-4



Greatest displacement power plant Greatest drawbar pull Lowest cost of all

The popular OC-4 heads its class!

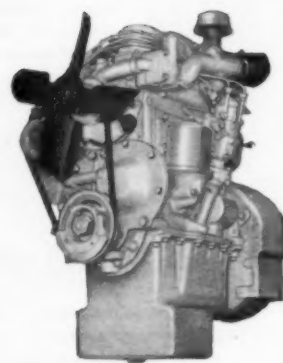
You get more of everything important—the choice of gasoline or diesel power, with the biggest cubic-inch-displacement engine of any crawler its size. That means more work power to begin with.

What's more, the OC-4 delivers the greatest drawbar pounds pull of all officially tested tractors its size—even at part throttle. Again, more work power! More earning power!

Yet, and here's the good news for

choosy tractor shoppers, the OC-4 is the lowest cost crawler in its class. You save at the start with the OC-4... make more from every job...and end up higher in income every time. A high-speed dozer, loader and digger—you can actually work it with over a dozen different versatile mounted attachments and equipment.

P.S. And only with the OC-4 can you have the choice of new "Spot-Turn" steering with oil clutches or planetary steering. Ask your Oliver distributor.



Most modern tractor power! This 4-cycle, 3-cylinder Oliver diesel has full 130-cubic-inch displacement... develops full power at lower governed speed for longer life. You move through hard work faster with its high-torque lugging ability. Also, 3-cylinder gas engine with 85% parts interchangeability!



THE OLIVER CORPORATION

Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio

a complete line of industrial wheel and crawler tractors and matched allied equipment

New Products

Utility Tractor

A new "Work Bull" 204 Utility tractor, announced by Massey-Ferguson,



Work Bull 204 Tractor

features three-point foot acceleration and instant no-shift change of direction.

Features include full-time power steering, multiple disc hydraulically actuated reversing clutches, and a torque converter that automatically adjusts power between speed and load requirements. It has high torque, 40 bare engine horsepower. Utilizing four-speed transmission with Hi-Lo range, the 204 will achieve speeds up to 16 miles per hour.

Massey-Ferguson Industrial Division, 1009 South West St., Wichita, Kan.

For more details circle 160 on Enclosed Return Postal Card.

Luminous Warning Flag

A red warning flag, luminous, and uniformly bright on both sides to give extra visibility day or night, is announced by Industrial Products Co. It is made of long lasting vinyl-bonded-to-nylon material with super strength dacron stitching and thermally reinforced edges to provide high tear strength. Designation is the "Ray-D-8-Flag".

Manufacturer states that the new



The "Ray-D-8 Flag", showing Diagonal Reinforcement to provide "windproof" action.

flag is exceedingly long lasting, will not fade or discolor, and is highly resistant to abrasion and temperature extremes. It is furnished standard in a special luminous red in sizes 13" x 13", 16" x 16" and 18" x 18"—complete with wooden staff. Also available in high visibility yellow and yellow-red combinations, and in grommets and special styles.

Industrial Products Co., 2924 N. Fourth St., Philadelphia 33, Pa.

For more details circle 161 on Enclosed Return Postal Card.

Ripper Boot

A new "wing-foot" boot attachment for "Ateco" heavy-duty rock rippers is now available. Designed for use with all forged Ateco 24 in straight ripper shanks, the "wing-foot" boot is claimed to produce greater lifting and fracturing action in shale, sedimentary rock, paving and similar materials. It is



Ateco Wing-Foot

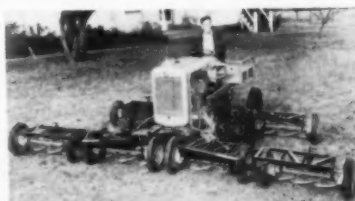
stated to not only speed up the ripping operation, but also to shatter material more completely for easy scraper loading. It can be installed or removed without taking the shank off the ripper swing bracket.

American Tractor Equipment Corporation, 9131 San Leandro Blvd., Oakland 3, California

For more details circle 162 on Enclosed Return Postal Card.

Gang Mower Control

A new model "F" tractor equipped with a variable-capacity gang mower control has been introduced by Worth-



Model "F" Tractor Equipped with "Wing Lift" Control

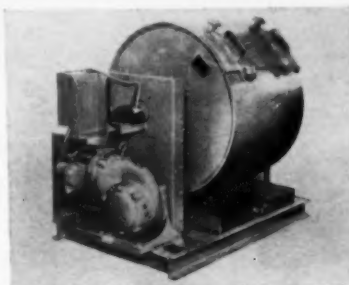
ington Mower Co. This control, known as the "Wing Lift," permits the cutting swath to be varied from the basic 3-gang unit (6 ft., 10 in. wide) to the full 7-gang that will cut a swath 15 ft., 6 in. wide. As on all Model "F" tractors with front wheel drive and rear wheel steer, all cutting units are mounted ahead of the power unit wheels to eliminate streaks and "over again" mowing. Wing units are raised and lowered hydraulically.

Worthington Mower Co., Stroudsburg, Pa.

For more details circle 163 on Enclosed Return Postal Card.

Abrasion Test Machine

Designed and built according to ASTM specifications, the Forney "Los Angeles" Abrasion Machine features sealed ball bearing pillow blocks, a motorized gear reduction unit, a Veeder Root automatic preset revolution counter switch, chain drive, and a quickly renewable baffle attached to the inner



The Los Angeles Abrasion Machine

shell instead of to the cover plate. Standard motor is 3/4 hp, single phase, 60 cycle, 115-220 volts. The unit is supplied complete with push button magnetic switch, overload control, tray, and one type "A" abrasive charge. Net weight—900 lb.

Forney's Incorporated, Tester Division, P. O. Box 310, New Castle, Pa.

For more details circle 164 on Enclosed Return Postal Card.

Aluminum Mixers

Aluminum transit concrete mixers are now in production by Construction Machinery Co., and North Star Sand and Gravel Co., Seattle, Wash., and Central Pre-Mix Co., Spokane, Wash.,



First Fleet of Aluminum Transit Concrete Mixers

already have fleets in operation.

Built of tough weldable alloy 5086, developed by Kaiser Aluminum, the new CMC "Transcetes" weigh less than steel models—approximately 4600 lb. for the 7-yd. unit.

The new mixers have the same basic design features as CMC's line of steel model "Transcetes" which are available in truck engine drive and separate engine drive models in 4, 5, 5½, 6 and 7-yd. sizes.

Construction Machinery Co., Waterloo, Ia.

For more details circle 165 on Enclosed Return Postal Card.

Traffic Flasher Alarm

Highway crews are given double protection against the hazard of oncoming traffic by a new product introduced by the Falcon Alarm Co.

To a flashing red warning light the new highway safety device adds a loud warning horn, which is triggered when a vehicle overrides the light and runs



Falcon Traffic Flasher Alarm

over an air hose placed ahead of a closed lane. The loud blast not only warns the motorist to slow down and move over, but gives warning up ahead to construction and maintenance crews, utility men, police at the scene of an accident, etc., allowing them time to get out of the way.

Falcon Alarm Co., Inc., 243 Broad St., Summit, N.J.

For more details circle 166 on Enclosed Return Postal Card.

Off-Highway Trucks

Two new International "Payhauler" rear-dump, off-highway trucks, featuring new International diesel engines and exclusive corrugated bodies are now in production. The units are the Model 95 "Payhauler", with heated body, with a struck capacity of 18 cu. yd. and a 27-ton payload, and the Model 65 "Payhauler", with a struck capacity of 12.5 cu. yd. and a 19-ton payload. Both trucks are powered by the most powerful diesel engine ever built by International—the "817". The larger "Payhauler" is equipped with the turbo charged version, the DT-817,



Model 95 "Payhauler"

with a maximum horsepower rating of 375 at 2,100 rpm. The Model 65 has the naturally aspirated D-817 engine.

Speeds up to 38 mph are obtainable with the Model 95. There is a choice of torque converter with power-shift, or nine-speed, air-shift transmission. The "65 Payhauler" delivers speeds to 36-46 mph through a 10-speed, constant-mesh transmission.

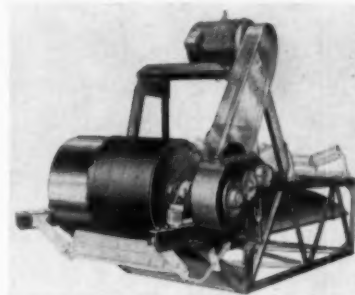
International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

For more details circle 167 on Enclosed Return Postal Card.

Belt Conveyor Drive

Better balance, greater accessibility, quieter operation, factory assembly and long-life construction are features claimed for the entirely new series of standardized torque-arm belt conveyor drives announced by Barber-Greene.

Available in a wide variety of belt



Barber-Greene Standardized Torque-Arm Belt Conveyor Drive

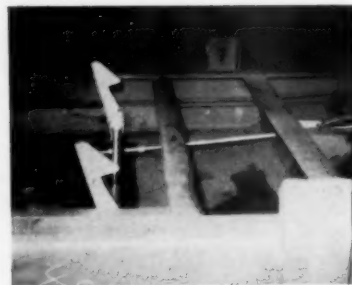
widths and horsepower ranges, these complete drive ends include head pulley, headshaft, bearings, reducer, V-belts, sheaves, motor support, V-belt guard, and frame.

Barber-Greene Co., Aurora, Ill.

For more details circle 168 on Enclosed Return Postal Card.

Trailer Locking Device

A new locking device, announced by Trailco, is claimed to eliminate vibration and wear in dump trailer bodies. Heavy spring-loaded clamps rigidly secure the body to the frame while the trailer is on the highway. When the hydraulic system is engaged to start the lift operation, an interim



"Lock-O-Matic" Locking Device

valve activates a clearing control on the mechanism and the clamps are swept free of the trailer body. Actual lifting force cannot be applied until the clamps are cleared. When the body is returned to road position, the clamps are automatically engaged and locked in position, assuring a vibration-free connection between trailer body and chassis.

Trailco Manufacturing and Sales Co., Rummels Wharf, Pa.

For more details circle 169 on Enclosed Return Postal Card.

New Products Improved Motor Oil

A new motor oil for fleet use, just announced by Cities Service Oil Company, gives a high degree of protection against both cold-engine sludge and hot-engine varnish.

The difference between this "C-300" oil and a conventional "Supplement 1" oil is clearly shown in the photo. At the left is a heavy-duty sock type filter removed from a fleet engine after 3,600 miles of severe stop-and-go driving at



low temperatures using the new "C-300". The filter is slightly discolored from the oil, but is still in perfect operating condition. On the right is a filter removed after identical service and mileage using a high quality "Supplement 1" oil with conventional additives. Heavy "shoe polish" sludge has completely clogged it.

The manufacturer recommends "C-300" for use in both diesel and gasoline engines, and states that tests show that it more than doubles filter life.

Cities Service Oil Co., 60 Wall Tower, New York 5, N. Y. Filters after Identical Runs with "C-300" Oil and "Supplement 1" Oil with Conventional Additives.

For more details circle 170 on Enclosed Return Postal Card.

Ask your Allis-Chalmers dealer to show you "And a Great Deal More"



"This TL-20 Loader Gives Us the REACH We Need at \$2,000 to \$3,000 Savings on Purchase Price"

"With our crushed stone and lime loading specifications running in excess of 1,000 tons per day," asserted Mr. Walter Van Gorden, treasurer-manager, Cave Stone Company, Cave Indiana, "our requirements on loading equipment are as critical as on any of our manufacturing units. All of the efficiency and production engineered into our excavation and processing equipment is of little value if we cannot maintain like values on the delivery end.

"Because of this, we investigated every available loader on the market before buying our TL-20 TRACTO-LOADER* in September, 1957. This decision was made on the basis of actual tests with each piece of equipment which indicated that the TL-20 consistently operated faster, reached far-

ther, lifted higher and gave us more pounds per bucket than anything else in its class. *We would have had to spend \$2,000 to \$3,000 more for a machine which would equal its production potential.*

"Our two primary requirements for a loader are height and reach. If bucket capacity were our only concern, we could have approached the load of our present unit by simply buying a larger machine of the same make as our previous one. The TL-20 was the only one available in this price class with a two-yard capacity, but, *more important, was the height of the lift and the length of the reach.* With competitive machines, we would have to load the 8 to 14-ton trucks from both sides to get maximum load and balance. The TL-20,

on the other hand, has a dumping height of 9 ft with a reach of 34 in. at this height. This increase means that we can easily load from one side without damaging the truck or holding up the driver over 4 minutes.

"Now, with this one machine, we are handling 80% of our loading, and have not yet extended it to its limits. We have yet to become involved with any type of maintenance other than the normal routine upkeep required on any piece of mechanical equipment. In spite of the rugged nature of the application, we expect a minimum of 5 years' service from the unit, and in all probability will replace it with an identical loader."

Let your Allis-Chalmers dealer show you how TRACTOLOADERS can increase your production.

*TRACTOLOADER is a registered Tractomotive trademark.

ALL TRACTOMOTIVE EQUIPMENT IS SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

TRACTO—
a sure sign
of modern design

TRACTOLOADERS • TRACTOSHVELS • TRACTORIPPERS • TRACTOHOES • TRACTOSIDEBOOMS

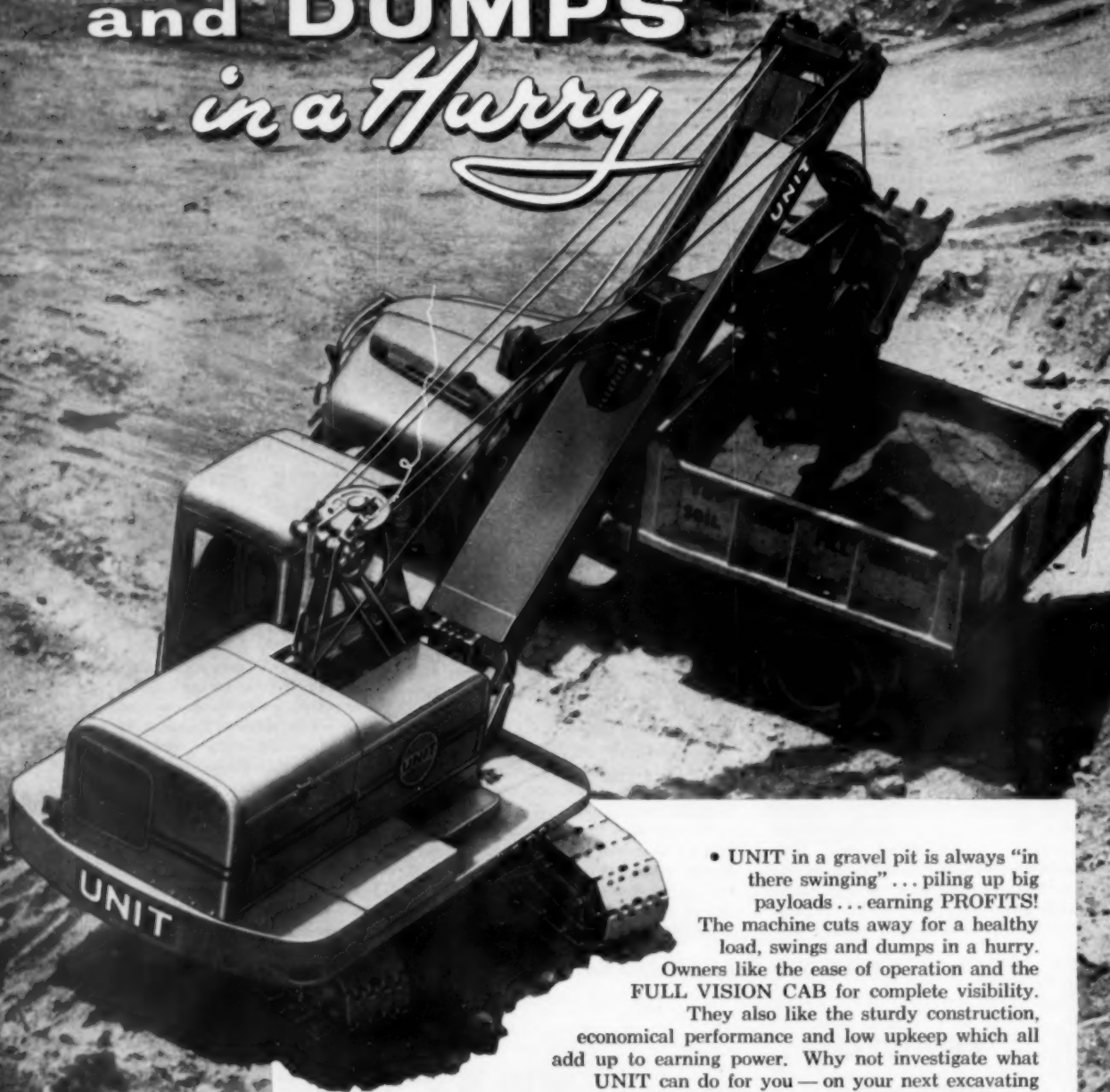
TRACTOMOTIVE

TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS





DIGS and DUMPS *in a Hurry*



- UNIT in a gravel pit is always "in there swinging" ... piling up big payloads ... earning PROFITS!

The machine cuts away for a healthy load, swings and dumps in a hurry.

Owners like the ease of operation and the FULL VISION CAB for complete visibility.

They also like the sturdy construction, economical performance and low upkeep which all add up to earning power. Why not investigate what UNIT can do for you — on your next excavating and material handling job? Write for literature.

UNIT CRANE and SHOVEL CORP.

6407 W. Burnham St., Milwaukee 19, Wisconsin, U.S.A.

A8-5019

New BROS Roller... See how you can benefit by these 15 improved features



NEW EASE AND SPEED FOR BASE AND SURFACE COMPACTION

Big news about the new 3 to 10 ton BROS SP-54B.

A new "Velvet Drive" hydraulic reversing transmission provides sure, effortless control for back-and-forth rolling. Automotive type hydraulic power steering and short turning radius makes turn-arounds easy—even on city streets.

Especially important, horsepower is correctly matched to job needs, keeping your fuel costs and engine maintenance to the minimum. Yet it provides the extra draw bar pull to tow a second roller on base and grade work.

A 40 gal. gas tank keeps the SP-54B working a full shift without refueling stops. High travel speeds to 20 MPH cuts time traveling between rolling jobs.

Special sculptured roller chain sprockets provide

full oscillation of drive wheel pairs. This eliminates complicated mechanisms which require frequent maintenance or service. New, 60% over-size high capacity Timken wheel bearings are mounted on husky, high-strength axles. A special triple groove steel labyrinth type seal and triple lip synthetic grease seal keep dirt and grit out.

Parking brake on drive shaft and individual service brakes on all 4 drive wheels add 95% more brake capacity... adding a greater margin of operator safety and control.

OTHER SP-54B FEATURES INCLUDE:

Torque converter drive... Direct connection of steering ram to front bolster... Lower center of gravity and lower silhouette... Easy access to drive train... New plastic scrapers to prevent tire pick-up... 100% coverage by ½ in. tire overlap.

Get the full story. See your BROS Dealer or write for full information and/or demonstration.



BROS Incorporated

ROAD MACHINERY DIVISION
1057 Tenth Avenue S.E., Minneapolis 14, Minnesota

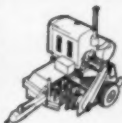
Write today for a new 8-page catalog which fully describes the SP-54B. It's free of cost or obligation!



SHEEPSFOOT
TAMPERS



ROLL-O-FACTOR



PREPARATOR



30-TON SELF-
PROPELLED ROLLER



VIBRA-FACTOR



9 AND 13-TON
ROLLERS

Rapid Rise Reported in Lime Stabilization

According to a recent survey by the National Lime Association, hydrated lime, which is still a relatively new stabilizing agent for roads, enjoyed its peak year in 1958 when awards reached 20,000,000 sq. yd. of roads, airport runways, and parking areas. This amount, equivalent to 1,435 miles of 24-ft. width pavement, represents a 33 percent increase over 1957. These figures include lime-pozzolan mixtures in addition to straight lime-soil combinations. Approximately 240,000 tons of lime were involved in the 1958 awards.

Lime is only used with paved roads for both new construction, reconstruction, and patching (maintenance). Percentages of lime employed range from as low as 1/2 percent for modification (lowering plasticity) of base courses to 6 percent for stabilizing highly plastic clay subgrades and subbases.

The largest single lime stabilization project was completed in January, 1959, at the Bergstrom Air Force Base at Austin, Texas, aggregating over 1,250,000 sq. yd.

of stabilized subgrade under jet bomber runways.

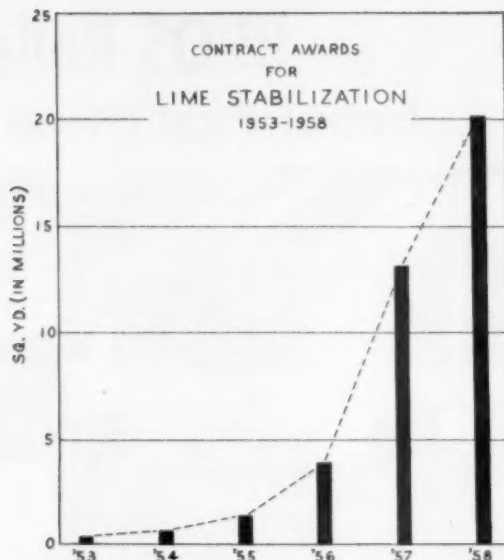
Since 1957, a total of 3,157,000 and 2,659,000 sq. yd. have been awarded in stabilizing the subgrade, subbase, or base courses of Texas Interstate Freeways No. 35 and 45, respectively. At present 26 states have now used at least some lime for soil stabilization. Several other states plan to use lime for the first time in 1959.

1958 Lime Stabilization Award Totals

Interstate System	5,900,000 sq. yd.
Primary Roads	7,060,000 sq. yd.
Secondary Roads	2,592,000 sq. yd.
Airport Runways	1,385,000 sq. yd.
City Streets	290,000 sq. yd.
Private Work	950,000 sq. yd.
Maintenance	1,923,000 sq. yd.

A further breakdown is:

Base Stabilization	8,630,000 sq. yd.
Subbase (or Subgrade)	11,470,000 sq. yd.



● Showing graphically how lime stabilization has taken hold in recent years.

New York Specifications to Clarify Safety Regulations

The New York state department of public works has taken steps to clarify its contract specifications requiring highway contractors to provide for the safety of their workmen and the general public.

J. Burch McMorran, state superintendent of public works, said that a recent modification in the state's specifications, effective on all highway contracts since April 1, 1959, specifically points out that the contractor must assume full responsibility for personal injuries and property damage which may arise from work in connection with their projects. Also that all work must be carried out in a workmanlike manner with due regard to the safety of employees and the public.

Heretofore, except for certain urban area projects, if hazardous conditions might exist, the contractor's safety responsibilities were never completely spelled out by department, although they are and have been included in regulations of the State Labor Department.

As a guide in determining what constitutes safe practices in highway construction, the new contract specifications recommend the contractor, his superintendent and his foreman become familiar with the Manual of Accident Prevention in Construction, a booklet issued by the Associated General Contractors of America outlining the desired procedures for safe working conditions and a safe place to work.

- Hydrated lime being spread uniformly on heavy clay subgrade on Interstate 85 project near Waco, Texas. This section was later paved with asphaltic concrete.



NEW FRUEHAUF "AIRSLIDE"® PRESSURE TANK-TRAILER

...Unloads 120 Barrels In 36 Minutes!

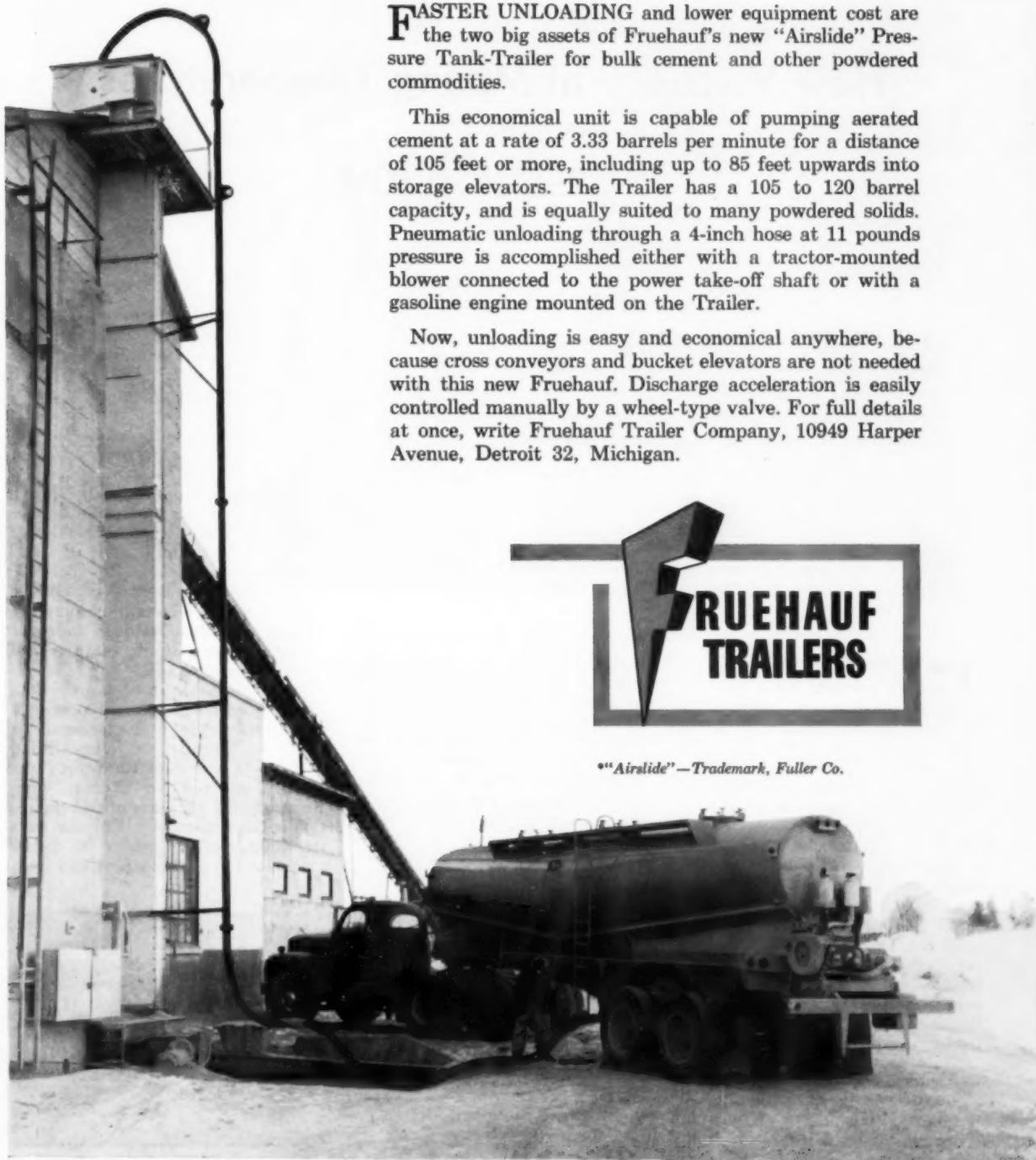
FASTER UNLOADING and lower equipment cost are the two big assets of Fruehauf's new "Airslide" Pressure Tank-Trailer for bulk cement and other powdered commodities.

This economical unit is capable of pumping aerated cement at a rate of 3.33 barrels per minute for a distance of 105 feet or more, including up to 85 feet upwards into storage elevators. The Trailer has a 105 to 120 barrel capacity, and is equally suited to many powdered solids. Pneumatic unloading through a 4-inch hose at 11 pounds pressure is accomplished either with a tractor-mounted blower connected to the power take-off shaft or with a gasoline engine mounted on the Trailer.

Now, unloading is easy and economical anywhere, because cross conveyors and bucket elevators are not needed with this new Fruehauf. Discharge acceleration is easily controlled manually by a wheel-type valve. For full details at once, write Fruehauf Trailer Company, 10949 Harper Avenue, Detroit 32, Michigan.



*"Airslide"—Trademark, Fuller Co.



Bituminous

ROADS AND STREETS

How Viscosity at Mixing Temperatures Affects the Mix

This authority proposes that public agencies revise their specifications and refiners work toward a range of viscosity more limited than heretofore in use, and that viscosity be recognized as a factor requiring definite control along with temperature limitation in asphaltic mixing.

By John M. Griffith

Engineer of Research, The Asphalt Institute
College Park, Maryland

THE MANY types and grades of asphalt are used for a wide variety of construction applications, but one common feature in all of these applications is that the product must be brought to proper fluidity for the particular application under consideration.

Asphalt is a thermoplastic material which is made fluid by heating. It may also be made fluid by emulsification with water or by blending with petroleum solvents. In many applications, proper fluidity is achieved by a combination of these processes. Regardless of how this fluidity is achieved, however, it is a well established fact that proper fluidity is essential for the successful use of all of these materials.

Fluidity is a factor which is well understood by the physicist and hydraulic engineer although he normally thinks of this factor in terms of viscosity, the inverse of

fluidity. Viscosity is a fundamental property of all liquids and may be measured in absolute units, poises, or in kinematic units called strokes. However, in the field of asphalt technology it is common practice to measure viscosity by the Saybolt Furol Viscosity Test. In this test, the time in seconds required for 60 ml. of asphalt at a given temperature to flow through a Furol orifice of given dimensions is determined.

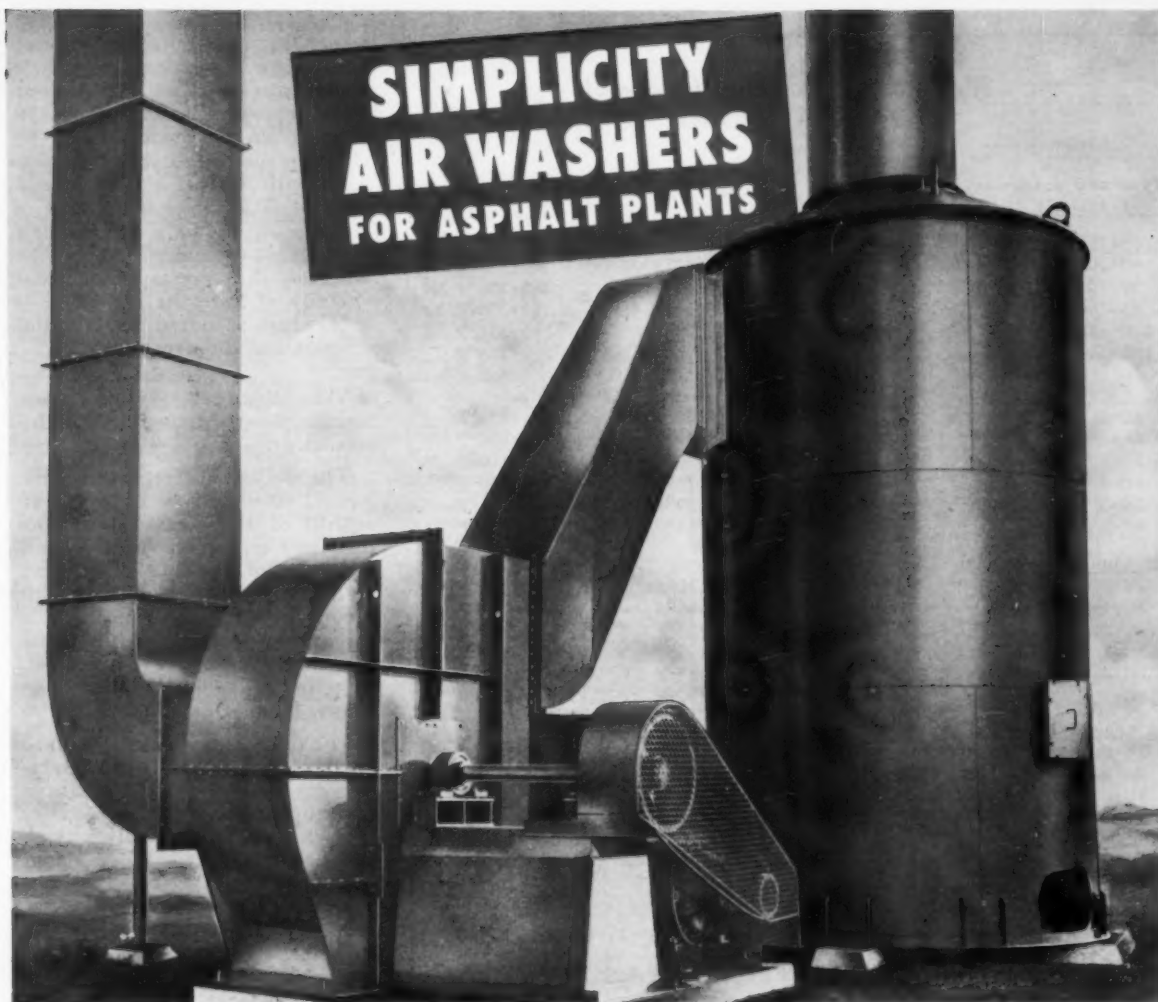
● Viscosity at this temperature is then expressed in terms of Seconds, Saybolt Furol. Capillary-tube viscometers are now coming into wider use in asphalt refineries as they offer certain advantages over the Saybolt Furol method. Regardless of how the viscosity may be measured, the fact remains that it is a fundamental property of asphalt in a fluid state. A better understanding of this fundamental property, and its

appropriate use by asphalt paving engineers, will undoubtedly lead to better and more uniform asphalt pavement construction.

One rather popular misconception about asphalts is that the viscosity characteristics of a given type and grade are constant, regardless of the source of the asphalt. Evidence of this misconception may be found in many specifications which require, for example, that all mixes prepared with an 85-100 penetration grade of asphalt cement be mixed within a certain temperature range. This may result in improper mixing, non-uniform mixtures and faulty construction.

To illustrate this point, data have been taken from a report by a reputable agency operating in a specific locality of the United States. These data were not "specially selected" or "office engineered" for purposes of this discussion but represent all of the data contained in this report for 85-100 penetration grades which had been

Text of a statement titled, "Effect of Viscosity of Asphalt Cement at the Temperature of Mixing on the Properties of Bituminous Mixtures," presented at a symposium on Temperatures in Bituminous Mixtures, Highway Research Board annual meeting, January 5-9, 1959, in Washington, D.C.



**ELIMINATE
SMOKE
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Prevent or quickly and satisfactorily settle many court orders and lawsuits . . . but it's lots smarter to eliminate smoke and dust before a complaint is made. A few days shutdown costs you more than the price of a Simplicity Air Washer!

Easily worth the money even where no neighborhood nuisance exists: Improves morale of plant crew. Protects expensive machinery from the destructive effects of dust and smoke.

Inexpensive but highly efficient. Simplicity Air Washers are part of most Simplicity Asphalt Plants and have been successfully added to all other makes. Full details and quotation to meet your requirements on request. No obligation; no sales annoyance. Simply address:

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THE SIMPLICITY SYSTEM CO.

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CHATTANOOGA 6, TENNESSEE

Suggested Temperatures for Use of Asphaltic Materials

Type and Grade of Asphalt	Suggested Temperature of Use	
	For Mixing	For Spraying**
Asphalt Cements		
40-50 pen.	300-350°F	***
60-70 pen.	275-325°F	285-350°F
85-100 pen.	275-325°F	285-350°F
120-150 pen.	275-325°F	285-350°F
200-300 pen.	200-275°F	260-325°F
RC Liquid Asphalts		
RC-0	50-120°F	65-135°F
RC-1	80-125°F	110-180°F
RC-2	80-150°F	140-210°F
RC-3	125-175°F	170-240°F
RC-4	150-200°F	180-255°F
RC-5	175-225°F	215-285°F
MC Liquid Asphalts		
MC-0	50-120°F	70-140°F
MC-1	80-150°F	110-185°F
MC-2	100-200°F	140-215°F
MC-3	150-200°F	175-250°F
MC-4	175-225°F	190-265°F
MC-5	200-250°F	220-290°F
SC Liquid Asphalts		
SC-0	50-120°F	70-140°F
SC-1	80-200°F	110-185°F
SC-2	150-200°F	140-215°F
SC-3	175-250°F	175-250°F
SC-4	175-250°F	190-265°F
SC-5	200-275°F	220-290°F
Asphalt Emulsions****		
RS-1	*****	75-130°F
RS-2	*****	110-160°F
MS-2	100-160°F	100-160°F
SS-1	75-130°F	75-130°F
SS-1h	75-130°F	75-130°F

In the absence of suitable temperature-viscosity data, this table provides a guide for use in determining application temperatures.

**Low temperature is based on a viscosity of 100 seconds, Saybolt Furol, for the liquid asphalt meeting the lower limit of this specification and the high temperature is based on 25-second viscosity.

***Seldom used for spraying.

****Since the working temperature range for emulsions is comparatively low and is only based on that temperature necessary to provide a viscosity at which the emulsion can be dispersed through spray nozzles, the same temperature is specified for use in spraying and/or mixing.

*****Not used for mixing.

used by the agency. Temperature-viscosity data for these 85-100 penetration grade asphalts are shown by the solid lines on Figure 1. As will be noted, the penetration at 77°F. of Asphalt A is 86, of Asphalt B is 95 and of Asphalt C is 93.

● Let us assume that an agency requires mixes with an 85-100 penetration asphalt to be prepared within the range of 275°-325°F. With such a specification, it is common

practice to use the middle of the range which, in this case, is 300°F. Data shown on Figure 1 indicate that at 300°F, Asphalt A would have a viscosity, in terms of Seconds, Saybolt Furol, of 150, the viscosity of Asphalt B would be 107 and of Asphalt C would be 57. Thus, the viscosity at 300°F of Asphalt C would be less than half that of Asphalt A.

Looking at these data from another viewpoint, assume for a mo-

ment that the ideal degree of fluidity for preparing an asphalt paving mix with an aggregate of given type and gradation is 100 Seconds, Saybolt Furol. It may be seen that such a mix should be prepared with Asphalt A at a temperature of 315°F, Asphalt B at a temperature of 302°F and Asphalt C at a temperature of 280°F. The difference in temperature for equal viscosity of Asphalts A and C is 35°F which is indeed a substantial temperature difference.

● The Figure 1 illustrates one further point relating to this discussion.

The dashed line represents temperature-viscosity data for an asphalt of 137 penetration. Note that the temperature-viscosity characteristics of this 137 penetration asphalt are almost identical with those of Asphalt C which has a penetration of 93. This difference in penetration is 44 points and, in terms of penetration measurements, is indeed significant.

The purpose of the discussion so far has been to bring out as forcefully as possible the substantial differences in temperature-viscosity characteristics of asphalts which may be encountered. These differences are to be expected as asphalts today are refined from a wide variety of crude petroleum sources. However, these differences should not be disturbing to the informed paving engineer who recognizes them and adjusts his construction procedures accordingly.

It seems obvious that an understanding of these temperature-viscosity variations, and proper utilization of this knowledge, cannot help but result in more uniform and better asphalt construction. Using extreme examples for purposes of illustration, one certainly would not attempt to mix an 85-100 penetration grade of asphalt cement with an aggregate when both were at ambient temperatures. Thorough and uniform coating of the aggregate particles could not possibly be achieved under such conditions and, even if this miracle were achieved, the mix could not be properly compacted as a pavement. At the other extreme, too high a degree of fluidity might well result in some of the asphalt draining off of the surface of the aggregate in transit, collecting in pools and causing fat and lean spots in the pavement. In addition, the excessive heat required to achieve

this fluidity would be unduly harmful to the asphalt deposited in relatively thin films on the aggregate particles.

● It is only logical, therefore, that for a given type and gradation of aggregate there is a corresponding "optimum" viscosity for mixing. This optimum viscosity is one at which all aggregate particles may be readily and uniformly coated with asphalt in a relatively short period of time, at which the asphalt is sufficiently viscous to remain in place on the aggregate particles and at a temperature which will have a minimum hardening effect on the asphalt cement. This viscosity may vary to some extent with variations in type and gradation of aggregate. The Asphalt Institute presently recommends that a mixing temperature be selected which will result in an asphalt viscosity of 75-150 Seconds, Saybolt Furol. Later, as additional experience is gained with the viscosity approach, there may be a need for some adjustment of these limits. But, it is believed that they are sufficiently accurate to result in substantial improvements in asphalt pavement construction if used in place of current practice wherein a temperature range is specified without regard to the viscosity characteristics of the asphalt in this temperature range.

Likewise, there is no doubt that better spraying applications could be achieved by giving proper consideration to the temperature-viscosity characteristics of the particular type and grade of asphalt being used. For spraying, The Asphalt Institute recommends a viscosity of 25-100 Seconds, Saybolt Furol.

In conclusion, it is emphasized that viscosity is a fundamental property of asphaltic materials which should be given thorough consideration in all of its construction applications. A proper understanding of this fundamental property, knowledge of how it varies with different asphalts and appropriate use of this knowledge will

unquestionably lead to more uniform and higher quality asphalt construction.

RALPH E. BOYD, President of The Galion Iron Works & Mfg. Company, Galion, Ohio, manufacturers of road rollers and motor graders, announces the appointment of Mr. Thomas F. Flood as Executive Vice President.

CHARLES L. ELLIS has been appointed chief field engineer of the Construction

Machinery Division of Clark Equipment Company, according to A. E. York, sales manager. He will direct all field engineering activities in connection with "Michigan" construction machinery.

KLEMP INTERNATIONAL, a new division of the Klemm Metal Grating Corporation, has been established to handle all aspects of Klemm's international-foreign trade. Lee Shelley, president of the Klemm Corporation, announced the new division will be located at 1379 N. North Branch Street, Chicago.

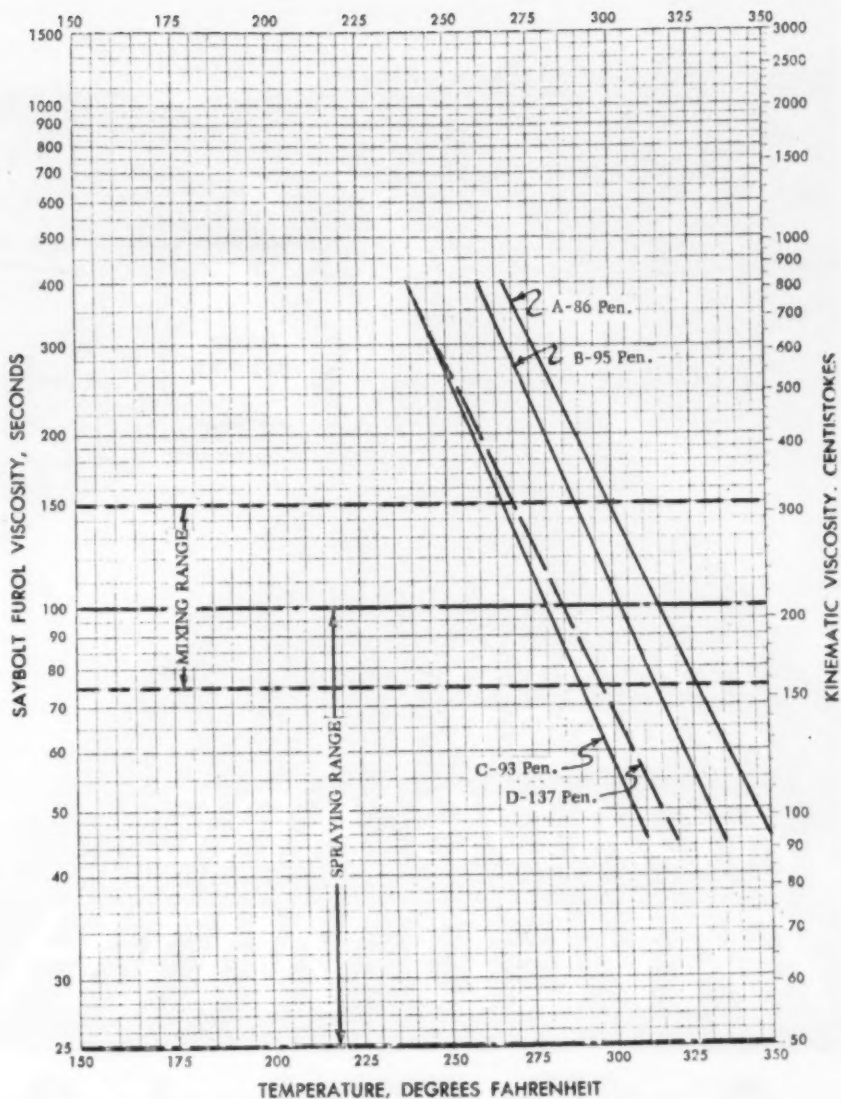


Figure 1—Temperature-viscosity relationships for three 85-100 penetration and one 137 penetration asphalt (latter shown in dashed line). See text discussion. Note: the correlation between Saybolt Furol and Kinematic viscosity is approximate only. (Graph form recommended by The Asphalt Institute.)



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The Changing Times

Highway engineers are well aware that there have been developments in the financial picture and the corresponding volume of road-building. Many, however, do not seem to realize that other highly important changes are also occurring.

The primary objective is still the same—to build the most roads with the money available. To some it has apparently become merely to build roads. The use of types hitherto considered inadvisable or uneconomical, the abandonment of old locations which by modifications and other changes could be economically adapted to the new program and other factors point to a disregard for economy in many areas. The feeling seems to be that with such lush funds at hand, past maxims and experience can be disregarded in favor of monuments to the builder's creative vision.

● We believe this a dangerous situation on both direct and indirect grounds. The latter are the effects on our national economy. As a nation we are ignoring unit costs as our totals of business volume rise. Yet unit costs determine our competitive position in international trade, in our ability to fight the cold war, in our ultimate economics of survival. If the Russians continue to beat us on this point, to work and study longer hours, to reward those who make the real contributions to increased productivity rather than who demand it because of political power, the final outcome will not be in doubt: the only question is how long will it take for these fundamentals to bring it about. And few expenditures are increasing like the total cost per mile of modern highways.

The immediate need for economy highway work is just as great. The bulk of the vehicle-miles will continue to be on our local roads. The interstate system will merely accentuate and highlight the need

for construction to lessen congestion in urban areas, to get the farmer out of the mud and dust, and in general to build up the feeder system without which the interstate roads will give limited relief. And this feeder mileage needing betterment dwarfs the interstate system. Yet if all the additional road funds which can be found not merely go to the interstate system but are spent with a lavish hand, the fate of the feeder program, of the normal development of primary and secondary roads is easy to foresee.

It is for these reasons that clear thinking highway engineers realize the need for new methods which permit more accurate and hence more economical design and construction. They are likewise aware that the very volume to which roadbuilding has increased, instead of encouraging waste makes possible as well as mandatory the appearance of such methods. Never before have highway engineers had such justification for attention to techniques, to the development of better ways to accomplish the things which we are now doing with such frequency.

The changes not so well realized are in these available tools. As noted, the increased rate of highway construction not merely demands but makes possible the development of better procedures. At present emphasis is essential in the fields of planning and design. As these are developed the corresponding construction betterments and the equipment needs therefor will be clear and, experience has shown, promptly made available. However, until this occurs, attention is required in the area of engineering.

What are these new methods? Some are starting to be accepted, such as the use of digital computers for some of the laborious calculations required. Others are just appearing. Among them are the general use of statistical techniques for better analysis and interpretation

of data, more accurate laboratory methods, and more rational design approaches. Looming in the background are such tools as analog computers or their equivalent for difficult technical problems, linear programming as an approach to better decisions in the highly complex problems facing highway administrators and engineers, and probably further tools which are being developed in other fields of science but not yet clearly of use in highway work.

● What is the feeling among highway engineers on this subject? This is an interesting question on which merely opinion can be rendered for whatever it is worth. It seems to us that there are varying attitudes. Some engineers are still registering satisfaction, perhaps even complacency, over the rapid development of arbitrary design approaches in recent years. There has been real and creditable ingenuity shown in this respect. Practically all the highway agencies have methods which they consider suitable for their requirements, yet the application of these various methods to the same problem results in widely different solutions.

Other engineers sense that this foretells trouble and are registering concern. The general attitude among these latter is an uncertainty as to what tools will be best or how to meet the problem, but an uneasy feeling that it must be solved. These are the people who will accept these new methods as soon as their value is realized.

Do these new approaches require a re-education of our older highway engineers? Because many of them frankly confess confusion when faced by such situations as statistical analyses or other approaches from which engineers familiar with them are drawing conclusions.

(Continued on page 176)



Compaction of

By John J. Laing

Chief, Road Equipment Branch, Division of Development,
Office of Operations, Bureau of Public Roads,
Washington, D.C.

Some of the most pressing problems in the field of highway production today involve the compaction of embankments, subgrades, base courses and surface courses. The more one delves into our current standards of procedural requirements for compaction of these various roadway elements, the more complicated the picture becomes.

There is considerable variance in thinking as to what should be the characteristics of the finished product with respect to density or to some measure to which future service behavior can be related. In many instances we are still requiring the same procedures and equipment that were employed years ago, although pavement designs and the character of the traffic using our highways have changed to a considerable extent.

Some equipment requirements in construction specifications are either restrictive or obsolete, since provisions are not included for taking advantage of new developments which are capable of superior or more economical performance. If rigid procedural or equipment requirements are used, they tend to stifle the initiative of contractors in developing new methods and to retard the development of improved and more adaptable equipment on the part of manufacturers.

Consideration of the compaction of asphaltic concrete surface courses and their supporting foundations is indeed timely, since about 16,000 miles of this type are now placed each year on the State highway systems alone.

The National Bituminous Concrete Association has recently adopted a 10-point improvement and quality control program* in which the compaction

Editor's Note:

This review, presented at the Kentucky Highway Conference, February 17, 1959, covers a field greatly in need of better performance data on today's array of equipment, from which the present confusing and obsolete specifications can be rewritten. Because of the importance of the subject to equipment makers, contractors and engineering agencies, Mr. Laing's review and appraisal are presented here in detail.

* Presented in detail in *Roads and Streets*, March, 1959, pages 187 to 194.

Asphaltic Concrete

problem has been given a very high priority.

● *Compaction of Base Courses.* While most of these remarks will be directed towards compaction of surface courses, it will be necessary to discuss, to some extent, the compaction of other elements which are part of the total pavement design. As has been pointed out many times before, it is difficult to consider a pavement surface without giving recognition to the base and subbase courses. Needless to say, the base should have sufficient supporting ability to withstand, without deformation, the reaction of tire loads that are imposed on it from the wearing course.

This ability to support involves the characteristics of the materials as well as density and moisture conditions. There seems to be a growing realization that a desirable degree of compaction for all embankment and base materials cannot be expressed as a single percentage of the maximum density at optimum moisture. For example, 95 percent may be too great for materials containing clay and insufficient for granular materials. A few States are using variable percentage requirements depending on the physical characteristics of the material used or its service record over a number of years. A majority of the states, however, are using a single percentage requirement for all materials used in base courses.

In addition to the prevailing ranges of density requirements, there is also a number of methods for the basic determination. We now have two methods under AASHTO test procedures for determining maximum densities, and a number of states have adopted their own method. Since each method provides a different answer, there is little opportunity to benefit from the exchange of experience in procedures and equipment application between States.

In addition to the ranges in density requirement and the method of attaining the same, there is a wide spread in the requirements for the maximum thickness of the base course layers to be compacted. It varies from a commonly used 3 to 5 in. to such maximum limits as 8 and 10 in.

● *Equipment Requirements.* Most of the current construction specifications for base courses provide for or require the use of conventional steel

QUICK READING—

- Engineers aren't together on how much density they want in a newly constructed asphaltic concrete pavement.
- Subgrade, subbase and base courses must be included in any overhauling of the procedure to insure uniform, even riding asphaltic concrete.
- The Asphalt Institute and the BPR recommend that density of surface course be specified as a percentage based on a laboratory mix.
- Greater use of rubber-tired rollers is held back by meaningless or restrictive specifications, and a lack of data on which better specifications can be written.
- Engineers haven't yet found an established way to rate various pneumatic rollers. Better performance criteria are needed on tire sizes, pressures and other variables.
- There is a growing interest, too, in vibratory rolling as a solution to asphalt concrete compaction, but—again—more performance data are needed on the equipment models now available before their use can be intelligently specified.

wheel rollers, tamping rollers and pneumatic tired rollers and, in some instances, the vibratory types.

Most of the pneumatic roller requirements do not provide for the use of the recently developed high pressure tires which appear to offer one solution for the densification of most types of base courses. The Michigan state highway department took a desirable step in their 1958 special provision covering test rolling with a heavy compactor by inserting the following requirement:

"The contractor shall furnish to the engineer, charts or tabulations showing the contact areas

ASPHALT COMPACTION

and contact pressures for the full range of tire inflation pressures and for the full range of loadings for the tire furnished."

With this information the engineer can determine the effect of varying wheel loads and inflation pressures for the tire size and the prevailing soil conditions. Heretofore, the engineer has been unable to determine the net results of modifying ballast and tire pressures.

● Contact areas along with contact pressures are of some importance when compacting or testing deep layers of soils, particularly in elastic materials where Boussinesq's theory* of pressure distribution is applicable. Tests conducted by the U. S. Corps of Engineers at Vicksburg, Mississippi, on large compactor size tires tested on lean clay soils, show that the loss in pressure due to smaller contact area was not significant at depths of less than 10 in. When tire contact area was decreased about 18 percent, a pressure loss of about 5 percent under that exerted by the larger tire was experienced at depths of 5 in. below the surface. The pressure intensity of approximately 90 percent of surface contact pressure was experienced at depths of 5 in. below the surface for the tire sizes and surface pressure employed. The smaller size tires may therefore have their place in base compaction (as later discussed).

Many current base construction specifications also exclude the use of the dynamic type compactors including the pad or plate types, on which reports indicate very good results in compacting granular type bases including macadam courses. Engineers have misgivings with regard to some types of equipment attachments. Tests, however, have shown that the addition of a trailing vibratory compacting unit to a 3-wheel roller enabled the equipment to obtain a higher density than could be obtained with the static roller regardless of the number of passes made.

* A series of equations expressing stress components caused by perpendicular, point, surface force, at points within an elastic isotropic homogeneous mass which extends infinitely in all directions from a level surface.

Vibratory steel wheel rollers are being used to a greater extent in compacting base courses. Most of the models used are of the towed type, although one small self-propelled roller of German manufacture was introduced in this country during the last two years and has demonstrated its ability to compact soil bases and asphaltic binder courses with a minimum number of passes.

There is a need for more performance information on many of the new rollers and compactors, particularly on the dynamic types, for various materials and conditions. A wide variance exists in the frequency of vibrations of the several vibratory models and in many of the manufacturer's claims on effective compaction depths and number of passes required for given density requirements. A considerable amount of basic research has been done on pad or plate type vibration by the California Institute of Technology with laboratory models in cooperation with the U.S. Navy Civil Engineering Corps. There have been no comprehensive tests made, however, with commercial models.

Good results have also been reported in the compaction of base courses with grid rollers and with segmented pad type rollers, but here again we need more information on performance for various materials and conditions.

The problems associated with the compaction of base courses certainly deserve more consideration than has been given them in the brief remarks contained in this paper. In moving ahead to the main topic of discussion, compaction of asphaltic concrete surface courses, some of the remarks made will also be applicable to base course compaction.

● *Compaction of Surface Courses.* First of all, it would be well to analyze what is being sought for in the stability of the final product. Based on available information, 26 of the 49 states and the territory of Hawaii have density requirements for finished asphaltic concrete pavements, 27 states and Hawaii have specific requirements, and one state establishes the density after the job mix is established. In Kentucky, specifications require a "satisfactory density as determined

by method of test designated by the engineer." Of the 28 states and territories having specific density requirements, 15 jurisdictions relate the requirement to a percentage of theoretical density or a voidless mixture. The other 13 base their percentage on the density of a laboratory mix. Not all identify the test for the laboratory design method used, but three indicated the Marshall method and another two the Hubbard-Field while several others indicated the California or Hveem method.

The range of requirements based on theoretical density varies from 85 percent for binder courses to 99 percent for surface courses. The range based on the density of laboratory mixes varies from 92 to 98 percent. One state increases its percentage requirement of laboratory density from 93 to 95 percent after September 1, 1959. Even when variances in mixes are considered, both ranges appear to be too great for products which are to be subjected to comparable truck tire loads.

With regard to the method of basing the density requirements, both the Asphalt Institute and the Bureau of Public Roads recommend a percentage based on a laboratory mix. This is because it is not always possible to attain a specified percentage of a voidless mixture without crushing the aggregate particles and thereby changing the character of the mix. A laboratory mix, on the other hand, always contains sufficient voids to allow for bleeding and for some degree of densification under traffic. A range of from 95 to 98 percent of laboratory density would be a desirable goal in the compaction of asphaltic concrete surfaces.

● *Equipment Requirements.* Practically all states have requirements for approved type rolling equipment for compacting asphaltic concrete surfaces. This includes those which have also adopted an "end result" requirement in the form of a minimum density. The advantages of end result features are largely nullified, however, by specifying the equipment to be used and the method to be employed.

● *Steel Wheel Rollers.* Steel wheel rollers, which have changed little from a capacity standpoint for several decades, remain the more commonly used units for compacting asphaltic concrete. A majority of the states require tandem rollers

for finish rolling, and permit either tandem or 3-wheel on the break-down rolling.

On the finish or final rolling, several states may require diagonal and/or cross rolling of the surface with tandem rollers. A number of asphalt technicians advocate this procedure to guard against undue post construction densification that often occurs under heavy traffic. Some of the objections to the steel wheel types, however, are their tendency to bridge over low spots and to confine the final degree of compaction achieved to a thin layer near the surface.

While there is reasonable uniformity in the general types of steel wheeled rollers required, there is a wide variation in the capacities as expressed in tons and minimum compression per inch of driving rolls. The tonnage requirements for tandems vary from 5 to 10 tons and on 3-wheel rollers from 8 to 12 tons. For 3-wheel rollers the minimum compression varies from 200 to 350 lb. per in. of driving wheel. For tandem rollers the variance is from 160 to 400 lb. per in. of driving wheel or a range of 150 percent between the low and the high requirements.

There is no correlation between the density requirements and the above minimum roller capacities. For example, a state which specifies 90 percent of theoretical density of the wearing course requires a greater compression (250 lb. per in.) on the driving wheel than a state (200 lb.) which requires up to 98 percent of theoretical density.

Torque converters are often desirable on tandem rollers which do the finish rolling due to the ease of reversing direction without scuffing the surface. Such rollers should be equipped with two-speed transmission if compaction on steep grades (6 percent and over) is contemplated.

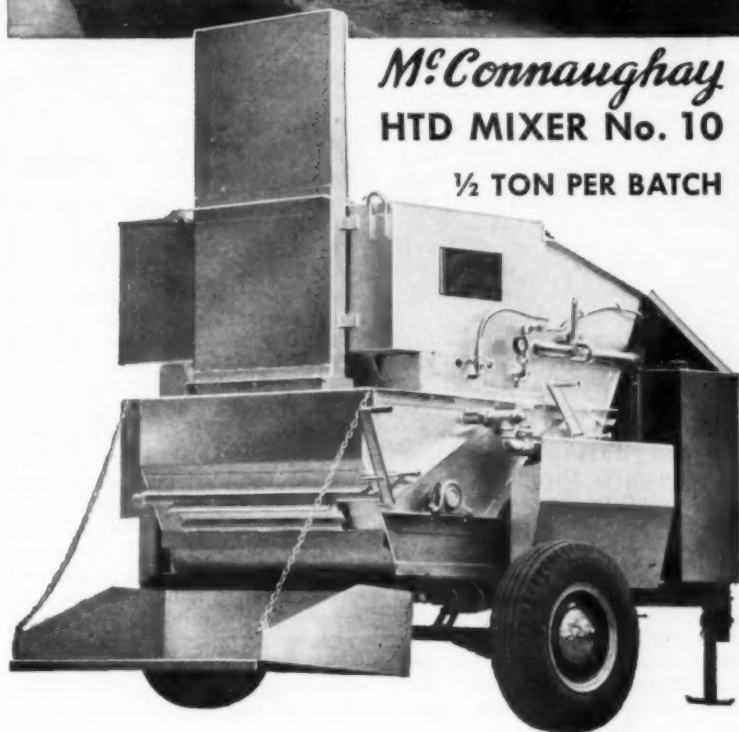
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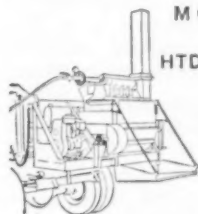


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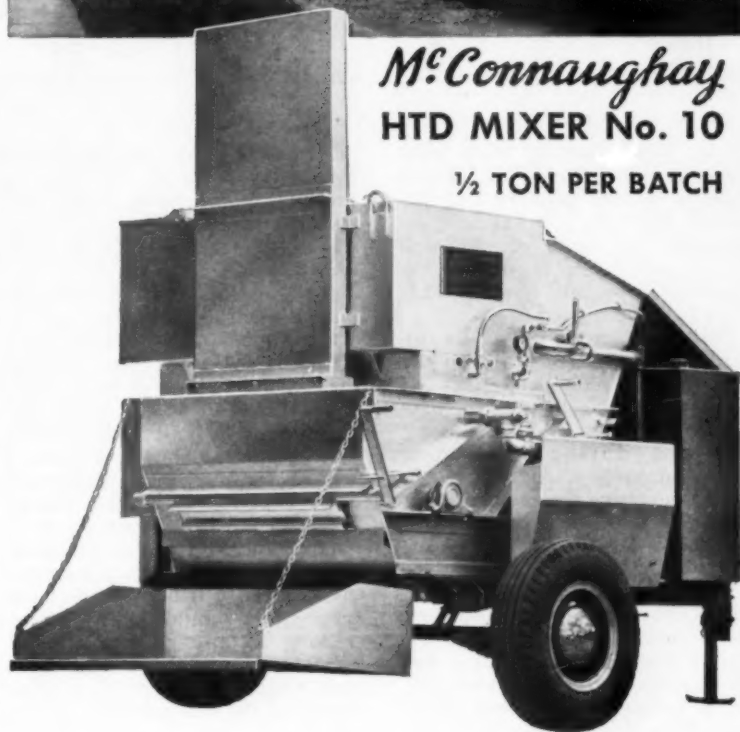
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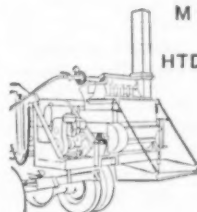


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Table I—Contact Areas of Highway Tires at Loads and Inflation Shown

Truck Tire Size	Ply	Inflation Pressure (psi)	Wheel Load (lb)	Contact Area (sq in)	Computed Av. Contact Pressure (psi)
7.50x20	8	65	2740	48.4	56.6
8.25x20	10	70	3330	50.5	65.9
9.00x20	10	70	3960	60.6	65.3
10.00x20	12	75	4580	71.8	63.8
11.00x20	12	80	4850	67.4	72.0
11.00x22	12	70	4750	75.3	63.1

tracks. Wheel rutting from track traffic is not confined to isolated projects on our primary and secondary highways, but has been experienced on some of our well known and better engineered expressways, especially where flexible bases have been used.

Past experience suggests the inference that where rutting of the asphaltic concrete surface has occurred in the wheel tracks, the base or surface courses or both were compacted during construction with equipment that was not capable of exerting the pressures produced by the heavier truck tires used today.

● Early in 1958 the Goodyear Tire and Rubber Company furnished our Bureau with information on contact area on truck tires for manufacturer's recommended inflation pressures and rated wheel loads. From this information it was possible to compute the average contact pressure for the various sizes. The term *average* contact pressure is used because the pressure is not constant throughout the elliptical contact pattern of the tire. The average contact pressure is obtained by dividing the contact area into the wheel load to obtain pounds per square inch or "psi." Contact areas are obtained for different wheel loads and inflation pressures by tracing the contact patterns on a glass or steel plate with the tire in a static position. Table I shows data for the more popular sizes used on the heavier truck combinations.

There are several other tires, notably in the 7.50x15—12 ply and 14.00x20, 18 ply sizes, which produce contact pressures up to 93.4 psi and 82.5 psi, respectively. However, these tire sizes are used to only a limited extent.

A study* made by the Division

of Highway Transport, Bureau of Public Roads, of the air inflation pressures in operating truck tires revealed that the current practice was to operate at average hot inflation pressures of about 10 percent above manufacturers' recommendation. While this would increase the average contact pressures shown in Table I, the study also revealed that maximum wheel loads were seldom used in actual operations. Accordingly, it is believed that the contact pressure shown in Table I may be considered the maximums to be expected in normal use. In the compacting or densifying of asphaltic concrete at the intermediate or semifinal stage with pneumatic tired rollers, it is believed that the rollers used should be capable of exerting an average contact pressure of at least 80 psi. The maximum required will depend to some extent on the characteristics of the mix.

All of the three currently manufactured smooth compactor tire sizes of the ply ratings indicated in Table II are capable of exerting average contact pressures of 80 psi and over.

Table II does not show the maximum contact pressure which can be exerted by each tire size, but serves to illustrate that all sizes are capable of exerting at least 80 psi. The two smaller sizes are also manufactured in 12-ply sizes which along with the 13.00x24, 18-ply size can be inflated to a maximum of 100 psi with standard rims and thereby obtain contact pressures approaching and exceeding 100 psi.

Compactor tires are rated for given wheel loads and inflation pressures (such as for the 7.50x15 and 9.00x20 sizes listed above), and the tire pressures and wheel loads may be reduced or increased within allowable limits of deflection. As inflation pressure is increased or decreased, tire manufacturers recommend that ballast be adjusted accordingly. A typical tabulation

showing the allowable ranges of inflation pressures and corresponding wheel loads for a compactor tire is included in Table III.

During the past year there have been some discussions relative to the pressure distribution of wheel loads below the surface. At least one group holds that the Boussinesq theory is applicable to all materials and conditions, and the surface contact pressure is assumed to be distributed below the surface in the shape of a cone radiating at an angle of 45 degrees from the perimeter of the tire contact pattern. (See Fig. 1.)

Under this assumption, for which we do not find substantiating evidence, some of the smaller compactor tires would lose 30 percent of their compacting effort 1 in. below the surface, about 50 percent about 2 in. below the surface, etc. I am sure that flexible pavement designers would appreciate the dissipation of heavy truck tire loads at such rates. Actually, Boussinesq's theory is applicable only for certain elastic materials of a homogeneous character which have constant properties of displacement in all directions. Very few highway materials are in this category.

● The subsurface influence of a given contact pressure on a circular or elliptical tire pattern appears more likely to take on the form of pressure bulbs in which the points of equal stress below the surface are shown as contours. Fig. 2 exemplifies typical pressure bulb distributions of stress influence lines for a single homogeneous layer of materials.

In examining the contours of equal pressures in Fig. 2, it is to be noted that the apex or center of the bulbs is located on an axis through the center of the tire both for normal tire pressures and for high inflations where the contact pressure at the center of the tire (P'') would greatly exceed that under the sidewalls. Conversely, under a low inflation the maximum pressure (P') would be at the edges where the tire receives structural support from the sidewalls. Under these conditions the material being processed receives additional horizontal pressures as well as the vertical pressures.

Work done in both the highway and agriculture fields as well as in the transportation industry, with pressure distribution on elastic materials for circular and strip loads, indicates that pressure equal to 0.9 of the surface contact pres-

* Public Roads, Vol. 28, No. 22, Feb. 1958.

sure (0.9 P) can be expected to depths of at least 3 in. below the surface. This pressure influence of 0.9 P would act on approximately two-thirds of the tire width. To get complete coverage of an area to 0.9 P at 3 in. depth of 3 in. in a single pass, it would be necessary to have at least some overlap of the front tire tracks with the tires on the rear axle.

Concentrated loads which are applied by truck tires when the highway is in service will not exceed the maximum pressures now obtainable with the smaller compactor tires on or below the roadway surface. In view of the foregoing, it is believed that compactor tire size is not significant in the compaction of asphaltic concrete courses to the depths of 2½ and 3 in., if the roller tires are properly spaced for overlap.

In addition to the high pressure pneumatic rolling of asphaltic concrete, there is some thinking among asphalt technicians that a pneumatic roller with low pressure inflation should be used for the breakdown rolling. When compactor tires are inflated at a low range, (30 to 40 psi) the tire contact pattern is concave and the horizontal forces exerted assist in particle placement and the kneading itself.

The question may now be asked, "Why aren't we making greater use of pneumatic tired rollers in compacting asphaltic concrete?" Such a question could be answered as follows:

1) Most pneumatic roller specifications are either meaningless or are restrictive because they have been written around a single model.

2) There has been a lack of basic technical information on which a non-restrictive specification could be based. (This includes such information as ground or contact pressures for allowable compactor tire inflation ranges and wheel loads.) * Only in the last several years has it been recognized that the average ground pressure exerted by pneumatic tires is not limited to or necessarily equal to inflation pressure.

● **Rating Pneumatic Rollers.** Let us examine some of the current methods used to rate the capacity of pneumatic rollers in construction specifications by the twelve States in which their use on asphaltic concrete is mandatory and

Table II—Compactor Tire Contact Pressures

Tire Size	Ply	Inflation Pressure (psi)	Wheel Load (lb)	Average Contact Pressure (psi)
7.50x15	10	90	5130	82.6
9.00x20	10	90	8000	83.0
13.00x24	18	90	12000	88.2 (Approx.)

an additional twelve States which permit or may require their use:

1. **Gross Weight.** Several States rate the pneumatic rollers approved for asphaltic concrete compaction by gross weight, and in one instance the number of tires is specified. Neither of these ratings is conclusive without information on the tire size and ply rating. The same applies to the so-called 50-ton compactor which for all practical purposes is a 30-ton compactor when ballasted for this weight. Several manufacturers advertise on the basis of maximum gross weight.

2. **Wheel or Tire Loads.** A number of States specify minimum wheel or tire loads varying from 1,000 to 8,000 lb. Criterion is also meaningless without tire size and ply rating data. Several of the minimum wheel loads as now specified are well below the minimum of the smallest compactor tire manufactured and must be termed obsolete. Wheel loads in the lower ranges (2,000 to 2,500 lb.) would be suitable for breakdown rolling purposes, but would be of little or no value for densification purposes in intermediate or semifinal rolling.

Table III—Contact Areas and Ground Pressures

9.00-20 12 Ply Smooth Compactor Tire on 7.00L Rim
at Various Loads and Inflation

	55 psi Contact	65 psi Contact	75 psi Contact	80 psi Contact	95 psi Contact	105 psi Contact
Load	Area Press.	Area Press.	Area Press.	Area Press.	Area Press.	Area Press.
4500	70.0	64.4				
4750	72.0	66.0				
5000	73.9	67.8	68.5	73.0		
5250	77.4	68.0	71.0	74.0		
5500	79.5	69.3	73.0	75.4		
5750	81.5	70.6	74.5	77.3		
6000	84.5	71.0	77.3	77.6	70.5	81.6
6250	87.0	72.0	79.6	78.2	72.2	83.1
6500	89.5	72.6	81.6	79.6	73.7	84.8
6750	91.5	73.8	83.7	80.6	75.7	85.8
7000	94.8	74.0	85.8	81.6	77.6	87.0
7250	97.0	74.8	88.0	82.5	79.6	87.8
7500	99.0	75.6	90.0	83.3	80.1	89.0
7750			92.1	84.0	80.1	93.5
8000			94.5	84.6	81.6	95.0
8250			96.5	85.5	83.4	96.2
8500			98.6	86.1	85.4	96.8
8750			101.4	86.2	87.4	97.4
9000					88.4	99.3
9250					90.6	99.4
9500					92.5	100.0
9750					94.0	101.1
10000					95.5	102.0
10250					97.1	103.0
10500					99.0	103.5
10750					101.1	105.0
11000						
11250						
11500						
11750						
12000						
12250						
12500						
12750						
13000						

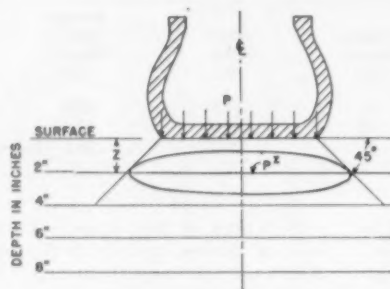
Underscoring denotes load and inflation for normal deflection of tire

Minimum deflection for above figures is 1.41"

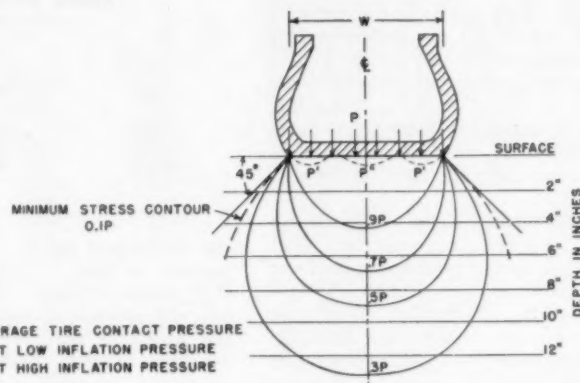
Maximum deflection for above figures is 2.35"

*A considerable amount of such information has been developed recently by tire manufacturers.

(Courtesy of Goodyear Tire and Rubber Co.)



P^Z PRESSURE AT DEPTH "Z" IS ASSUMED TO BE ACTING ON A CIRCULAR OR ELLIPTICAL SECTION OF A CONE. MAGNITUDE OF P^Z IS INVERSELY PROPORTIONAL TO STRESSED AREA.



● Figure 2—Typical pressure bulbs, showing stress distribution as influenced by tire contact pressures.

COMPACTION

3. **Weight Per Inch of Tire Width.** Quite a number of states rate the required pneumatic rollers by the "weight per inch of tire width." This rating has little or no significance because the tires make an elliptical pattern and the weight per linear inch varies both for tire sizes and within the pattern itself. This rating seems to be a carry-over from the rating of steel wheel rollers which actually produce rectangular contact patterns under most conditions. If the "weight per inch of tire width" requirements were converted into wheel loads on the basis of tire contact width for various tire sizes, it would represent a sizeable range in the contact pressure exerted. For example, a requirement of 600 lb. "per in. of tire width" could convert into a contact pressure of 62.0 psi. for one size tire and into a contact pressure of 81.6 psi. for another size. This is a differential of over 30 percent in compacting effort.

4. Inflation Pressure. If tire inflation pressure is specified, it could represent a considerable range in contact pressure due to tire sizes and wheel loads (see table III for contact pressure ranges for only one tire size).

It can be seen from the foregoing that, of all the current roller requirements, those used for pneumatic rollers are the least expressive of the equipment's ability to perform.

The ability of smooth compactor tires to exert a given contact or

ground pressure is dependent on the factors: tire size, ply rating, wheel load, tire inflation pressure. It would be possible to specify all of the above factors and still have a restrictive specification because rollers equipped with other size tires under different wheel loads would be capable of exerting comparable contact pressures.

It is our belief that the *contact pressure range* should be the principal criterion in rating the pneumatic rollers to be used in compacting asphaltic concrete courses and thin layers of base materials.

● **Pneumatic Roller Requirements.** Until now we have pointed out some of the apparent deficiencies in rating pneumatic rollers. On the positive side it might be worth while to suggest some preliminary guides for describing desirable overall characteristics of pneumatic tired rollers to be used in compacting asphalt concrete courses and thin layers of base materials, pending the development of suitable performance criteria. First of all, a minimum width of about 6'-6" would be desirable from a production standpoint. The unit should be equipped with smooth wide tread compactor tires, capable of exerting an average contact pressure variable from 60 to 95 psi. uniformly over the surface by adjusting ballast and tire inflation pressure. The wheels should be so mounted as to prevent scuffing of the surface during rolling or turning, with provisions for wetting and cleaning tires.

The mentioning of desirable

pneumatic roller characteristics in this paper is not necessarily a recommendation for their inclusion in a construction specification. While a number of current models could measure up to these suggested guides, a new model might be introduced this year or next year which would make these features obsolete or restrictive. As you know, the revision and reprinting of construction specifications is a time-consuming procedure. It would seem preferable to develop an "end result" specification where density or other finished characteristics, in addition to profile and crown tolerances, would be specified.

● **Vibratory Compaction Equipment.** The principle of vibratory compaction has been incorporated in the asphaltic concrete lay-down process for some time. An American manufacturer has recently introduced a 3-wheel tandem roller with vibration on the middle roll. This roller may have application in the compaction of both binder and surface courses of asphaltic concrete. The vibratory roll is retractable, which will allow the roller to be used as a static unit for finish rolling.

As previously mentioned, a small self-propelled vibratory roller with vibration on the driving wheel of the tandem, was introduced in this country about two years ago. It has demonstrated its ability to compact granular bases and asphaltic binder

(Continued on page 176)

INTRODUCING

NEW-IMPROVED

BatchOmatic

AUTOMATIC ASPHALT PLANTS



OUTSTANDING PERFORMANCE, widespread use, and record tonnage production of BatchOmatic plants, of all sizes, have proved their revolutionary principles and features, first introduced in 1955:

First inherently automatic design . . . simultaneous measuring of all aggregate gradations . . . new principle of asphalt measuring . . . pre-set proportions . . . larger screening area, including full deck for fine material, and new adjustable directional throw . . . exclusive material flow selector . . . new Dyna-Mix pugmill for faster mixing, faster discharge . . . fast-stacking, self-contained sections with quick-disconnect couplings . . . and many others.

Now Barber-Greene announces the new BatchOmatic series, incorporating more outstanding advances—improvements based on the experience of all BatchOmatic plants operating on every type of job, producing every type of mix, including the abnormally rigid specs of the AASHTO Test Road. These new features and improvements further increase ease and flexibility of operation, and daily tonnage output.

No lost seconds in automatic cycling—Only dry and wet mix cycles are controlled by timers. New sequence-relay system automatically starts each function the *instant* the previous one ends, substantially increasing tonnage.

New electric-over-hydraulic main controls—Controls electrically actuate hydraulic valves located directly on the rams, greatly reducing hydraulic piping, fittings and valves. Simpler construction and maintenance.

25% more weigh-hopper capacity—The unique multiple BatchOmatic weigh-hopper, which permits simultaneous measuring of all gradations, has been enlarged. Adjustable sidewalls are hydraulically controlled separately or simultaneously. Unlimited flexibility for handling all extremities of gradation percentages.

Multiple pre-set mixes—Easily switch to any pre-set mix. Pre-setting is instantly cancelled hydraulically for special mix. Automatic return to pre-set to resume production.

New, faster change of asphalt content—The unique, adjustable suction pipe measuring principle can now be quickly dial-set to the required number of pounds.

New fines control with fast change of proportion—Immediate dial-setting of fines content for any percentage of bulk or bagged mineral filler through new special vane feeder.

Also available with single weigh-hopper and power controls—These power-control towers have most of the BatchOmatic features, including interlocked dry and wet mix timers, and the asphalt measuring system. Available as 2- 3- 4- 5- and 6000-pound plants.

New, improved auxiliary units: New, improved Barber-Greene Dryers, Portable and Stationary Dust Collectors, Aggregate Feed Systems, and completely new Wet Scrubbers further increase production of all asphalt plants.

These are just the high spots. Ask for literature on these new advancements.

59-13-A

Barber-Greene

AURORA, ILLINOIS, U.S.A.

CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

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ROADS AND STREETS, June, 1959

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NEVITT

(Continued from page 167)

The answer is definitely no! Their practical experience is too important. They merely need to recognize that the tools exist and that there are people who can handle them satisfactorily. Undoubtedly the young engineers in the highway field will have to develop some real understanding of these new techniques; and probably there will be an intermediate phase where dependence will have to be placed by the highway departments on outsiders who are sufficiently experienced and competent in the field of highway engineering as well as these new developments to know what tools can be used and what they can accomplish; but this will all straighten out in due course.

The only thing we need to fear is resistance, either active or passive, to the adoption of these methods as their applicability and merit to highway problems become apparent.

● We realize that these remarks may not remove the doubts that exist in many highway engineers as to exactly what these new tools are, how they function and what they do. Unfortunately neither space nor, with some of them, the writer's knowledge permits such an exposition. However, we again repeat that to successfully avail themselves of these procedures highway engineers need no more than the realization that they exist, that they have great merit and that this can be demonstrated to them by those in the field who are conversant with these approaches.

What do these tools offer in the attainment of our primary objective discussed above? Primarily they offer more precise design, more clear-cut decisions, a better definition of exactly what must be attained in the construction process, and in due course the development of better equipment to assure such attainment. The adoption of these new techniques is therefore not a matter of convenience, preference or similar. It is instead a matter of economic necessity; the savings possible from these new approaches demand their adoption as rapidly as their applicability to the highway field becomes apparent. This is a responsibility from which we cannot escape.

Drying, Moisture Control, Automation Discussed in Michigan Panel Session

The problems of drying and moisture control in aggregates and the question of automatic controls for plant operation were discussed at a three-hour panel session, sponsored by the Michigan Asphalt Paving Association last month in Lansing. Over 70 industry representatives were in attendance.

As reported in the Newsletter of the National Bituminous Concrete Association, the meeting was a preliminary to the actual formulation of a research project in Michigan as part of NBCA's new Ten Point Quality Improvement program.

Professor Robert F. Baker from the Engineering Experiment Station, Ohio State University gave a brief summary of a two-year study into drying of aggregates at the university. He pointed out that there had been little change in the basic design of internally fired driers during the past 30 years, except to make them longer and larger in diameter. His studies indicated it took temperatures in the range of 500 to 700 degrees Fahrenheit to completely dry coarse aggregate over 1/4 in. in size and only about 300 degrees for sand-size ag-

gregate. Also, there was a wide range in the heat transfer time required for various sources of aggregates. This was supported by W. C. Wright in experiments conducted by him during the past winter in a new type drier which he designed and built himself.

COMPACTION

(Continued from page 174)

courses to required densities with a minimum number of passes. More performance information is needed on both of these vibratory rollers.

Although the use of vibratory compacting equipment on asphalt concrete courses has been limited, there is a feeling in some quarters that application of the dynamic principles offers one of the solutions to the compaction of asphaltic concrete.

While some progress has been made recently in obtaining a better understanding of the asphaltic concrete compaction problem, much remains to be accomplished, particularly in obtaining unbiased appraisals of equipment performance and in narrowing down the wide spread in other procedural or end-result requirements.

Travelin' Concrete Paving Spreader

Uniquely adapted for off-the-job travel, this finishing machine did double duty—spreading and finishing—during concreting of aircraft taxi and parking areas at Malton Airport, near Toronto. Huron Construction Company, Limited, of Chatham, Ontario, modified the Blaw-Knox finisher to include two 45-in. diameter rubber-tired wheels. These lower for tow-type travel between paving strips, and reduce time-consuming trailer loading and unloading of the unit for job-to-job hauling.

Moving on Blaw-Knox airport paving forms the machine handled nearly 1,000 cu. yd. of concrete per day in a 12-in. thick, 20-ft. wide pass over a 12-in. thick gravel base.



Manufacturers' Literature

CONCRETE FACTS: A 6-page bulletin, P-36 B, available from Public Relations Department, The Master Builders Co., Cleveland 3, Ohio, contains a concise analysis of the nine vital factors governing the production of high quality concrete. It contains charts, graphs, and photos on the use of Puzzolith.

For more details circle 172 on Enclosed Return Postal Card.

STABILIZED BASE MIXERS: A new 8-page bulletin, SBM-1, released by Iowa Manufacturing Co., Cedar Rapids, Ia., completely describes two models of Cedarapids stabilized base mixers. The models include a large, twin-shaft unit that will thoroughly mix 300 to 600 tons per hour of aggregate with a specified water additive and a smaller highly portable model that will mix up to 300 tons per hour. The smaller unit includes a 5-yd. hopper over a conveyor and a single shaft pugmill all mounted on a single truck frame with running gear.

For more details circle 173 on Enclosed Return Postal Card.

THE WARNER & SWASEY CO. CONSTRUCTION EQUIPMENT DIVISION, 5701 Carnegie Ave., Cleveland, Ohio has issued a folder illustrating and describing its new "Gradall", Model G-1000, which has a lifting capacity of 7 tons and will dig to 18 ft. 3 in. Boom extensions increase digging depth to 29 ft. Folder shows the machine at work at a variety of jobs, and pictures it as both truck-mounted and crawler mounted.

For more details circle 174 on Enclosed Return Postal Card.

CONCRETE JOINT CURING TAPE: A new illustrated bulletin, available from Presstite Division, American-Marietta Co., 39th and Chauteau Aves., St. Louis, Mo., describes "ComSeal", a new product designed to cure sawed or formed concrete joints and also to keep the joints clean until they are sealed. Bulletin describes the product, how it is applied, and how expensive hand operations, often necessary with conventional methods, are eliminated.

For more details circle 175 on Enclosed Return Postal Card.

FORK LIFT TRUCKS: Three new pieces of literature on fork lift trucks are available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Four page folder, BU-302A, contains

specifications on the entire line of lift trucks. Another piece, BU-452, is a review of the engineering features of the lift trucks. The third piece, BU-453, spot lights the recently introduced "Hefty", the 2000-lb. capacity FT-20-24 lift truck.

For more details circle 176 on Enclosed Return Postal Card.

WIRE ROPE HANDBOOK: A new "Wireco" wire rope recommendation handbook has been announced by Wire Rope Corporation of America, 609 North 2nd St., St. Joseph, Mo. It was compiled by Wireco engineers. It gives wire rope users a complete, basic working knowledge of the characteris-

tics of different wire ropes and slings. The book details uses in virtually all industries, and outlines how to select, order and use the correct wire rope to do a specific job.

For more details circle 177 on Enclosed Return Postal Card.

JOINT SEALER, JOINT CURING TAPE: New literature issued by Presstite Div., American-Marietta Co., 39th and Chouteau Ave., St. Louis 10, Mo., describes a polysulfide polymer, two-component, cold-applied sealing compound designed specifically for sealing joints in portland cement concrete exposed

(Continued on page 179)

SWENSON SPREADERS

Speed Sealcoating!

Spreads Salt or Chloride for DUST CONTROL or SOIL STABILIZATION

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SWENSON SPREADER & MFG. CO.

Lindenwood, Illinois



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LOOKOUT MOUNTAIN, TENNESSEE



Before

Man in center of road way with red flag, waits to release traffic to use one-lane of construction or black-topping job.

After

Dale Bracken, left, stands by his pickup truck equipped with two-way radio, ready to release traffic waiting near Clarion, Pa. on state route 322.



Radio-ing Traffic Through The Job

Bracken Brothers, asphalt contractors of Sligo, Pennsylvania, last summer tackled the problem of handling heavy traffic through their jobs with a new twist:

"We began using two-way radio to help direct motorists," explained Dale Bracken, one of the five brothers in the firm. "It took the place of the traditional 'red flag' method,—you know, where the last motorist in traffic going one way takes a red

flag to the other end of the road-building operation, and traffic is released to proceed in the opposite direction."

The Brackens, who secured Pennsylvania highway department approval of this method, claim two-way radio improves public relations while enabling them to place more road daily than formerly.

"One-lane use of a state highway during the busy summer months

has been a source of inconvenience to motorists for decades," Bracken said. "Using two-way radio, we can do away with the red flag, and keep everyone happier."

With the radio, flagmen can compare the lines of cars awaiting the use of one-lane while the other side is being surface treated or resurfaced. The heaviest line of traffic gets priority, when possible.

Highway officials also like the help two-way radio gives them in checking job details. Bracken Bros. can talk to their plant, sending out loads of material and speed up or delay the trucks, depending upon the weather and conditions of construction.

To top it off, two-way radio gives the entire job closer relationships, hence speeds work and eases tempers, and is available to help in any accident or other type of emergency, according to the Brackens.



● Dale Bracken sits in radio-equipped truck and calls black-top mixing plant, orders a certain mix for the job.

FWD CORPORATION, Clintonville, Wisc., has named Hubert McCarthy to head the newly created Market and Distribution Research Department.

Manufacturers' Literature

(Continued from page 177)

to the action and operational requirements of jet aircraft. Other literature describes a curing tape, "Conseal", used to prevent moisture loss from new concrete joints and to keep joints clean until ready to seal.

For more details circle 178 on Enclosed Return Postal Card.

VIBRATING SCREENS: An 8-page folder issued by Overstrom & Sons, Inc., 2213 W. Missini Road, Alhambra, Calif., features a new method of estimating screen area requirements. Various types of Overstrom equipment, construction and operating features, and application are also described.

For more details circle 179 on Enclosed Return Postal Card.

"DIESELS OUT-PERFORM GASOLINE ENGINES": A new brochure, available from Detroit Diesel Engine Division, General Motors Corporation, Detroit 28, Mich., describes how the diesel works, and compares diesels to gasoline engines on points such as work-producing ability, economy of operation and life span.

For more details circle 180 on Enclosed Return Postal Card.

DROTT SKID-SHOVEL: A new 16-page catalog, CR-600-1, issued by International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill. graphically depicts features of the International Drott TD-15 "4-in-1" skid shovel. On-the-job photographs show the exclusive Drott "4-in-1" bucket, which provides four construction units in one tractor loader.

For more details circle 181 on Enclosed Return Postal Card.

"PENNSYLVANIA 3-AT COMPRESSORS": A new 8-page bulletin No. 350, announced by Pennsylvania Pump and Compressor Co., Easton, Pa., describes and illustrates the Pennsylvania 3-AT compressor. Photographs, line drawings, and cross-sectional views illustrate the construction of this compressor.

For more details circle 182 on Enclosed Return Postal Card.

"VIBRATING SCREENS": A new 48-page book No. 2777, published by Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill., covers vibrating screens of 12 different types in 212 sizes. The book describes and illustrates each of the screens and foundry shakeouts as they are used to meet screening and shakeout needs of practically every in-

dustrial. Complete tables of materials, selection data, easy-to-read drawings and cut-away photographs showing construction features are also given.

For more details circle 183 on Enclosed Return Postal Card.

BARBER-GREEN CO., 400 N. Highland Ave., Aurora, Ill., has issued a 12-page circular covering some of its new products. Included are illustrations and brief description of four finishers, two models of batch plant, stabilization plant, road widener, portable screening plant, and trenching machine.

For more details circle 184 on Enclosed Return Postal Card.

WIRE ROPE: A 190-page "Blue Book of Wire Rope," G-16, has been published by Macwhyrte Wire Rope Co., Kenosha, Wisc. Included in it is information on inspection, correct spooling, constructions, sheave maintenance, multiple-rope reeving, swaged fittings, and use and abuse of wire rope.

For more details circle 185 on Enclosed Return Postal Card.

"MATCHING THE WIRE ROPE TO THE JOB": A 4-page service bulletin, No. 107, available from Leschen Wire Rope Division, 2727 Hamilton Ave., St. Louis 12, Mo., provides specific recommendations for wire rope to be used on all types of equipment from aerial tramways to winches. In many cases two or three choices are provided, depending on special circumstances under which the equipment is working.

For more details circle 186 on Enclosed Return Postal Card.

"TRENCHES": A new 4-page folder, Bulletin L-104, published by The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio, covers the three new "J" trenchers introduced earlier this year. Text of the folder, aided by mechanical illustrations describes the new design and construction features in terms of how they improve operation.

For more details circle 187 on Enclosed Return Postal Card.

MOBILE CRUSHING EQUIPMENT: Gruendler Crusher & Pulverizer Co., 2915-17 North Market St., St. Louis 6, Mo., presents a 6-page folder of pictures and short descriptions of about 30 units and assemblies of its equipment in service. Included are jaw and roll crushers, hammermills, apron and reciprocating feeders, conveyors, bucket elevators, revolving and vibrating screens, steel bins, sand drags and washing screens.

For more details circle 188 on Enclosed Return Postal Card.

FARM TIRE DATA BOOK: A 32-page book published by B. F. Goodrich Tire Co., Akron, Ohio, lists specifications and describes correct use and maintenance of tires for farm and industrial use. Book lists inflation and load data for all B. F. Goodrich agricultural tires and carries information on liquid weighting of tractor tires, tractor tire service equipment, mounting and demounting, and the use of wheel weights.

For more details circle 189 on Enclosed Return Postal Card.

NAPCO CRAB TRACTOR: New brochure, Form No. CT-12, covering this 4-wheel drive, 4-wheel steer tractor is available from R. J. Raybach, Sales Manager, Construction Equipment Division, Napco Industries, Inc., Seventh St., North Lyndale, Minneapolis 11, Minn. Action photographs of the tractor at work, and photograph of attachments are included.

For more details circle 190 on Enclosed Return Postal Card.

TESTING APPARATUS: An 8-page bulletin illustrates and describes 10 recently developed items added to the line of testing apparatus of Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill. Included are apparatus for concrete, soils and asphalt testing, as well as the Soiltest Beggs deformeter for solving problems in the design of indeterminate structures.

For more details circle 191 on Enclosed Return Postal Card.

FULLER MANUFACTURING COMPANY, has released Vol. 8, No. 2, of "Transmission Topics" magazine. This issue features the announcement of "Fullair Control", Fuller's new system of shifting gears entirely by the means of compressed air. Also featured are the Fuller pressure filtration and lubrication systems, now standard on several Fuller off-highway transmissions. A review of "Private Trucking Costs and Records", a study published by Texas Transportation Institute, is included. Copies of "Transmission Topics" are available from Fuller Manufacturing Co., Transmission Division, Kalamazoo, Mich.

For more details circle 192 on Enclosed Return Postal Card.

TRENCH DRILLS: A new 6-page bulletin (TD-159) issued by The Salem Tool Co., Salem, Ohio, gives complete operating specifications, dimensions and recommended uses for its new line of trench drills. The three models shown will handle augers up to 6 ft. long and 24 in. in diameter. They bore holes and push pipe simultaneously.

For more details circle 193 on Enclosed Return Postal Card.



● Latex mortar, mixed on site with conventional equipment, holds promise of simplicity and economy in highway and bridge resurfacing.

Dow Expands Use Tests of New Latex Mortar

Broadened use tests of a tough new mortar, based on latex, for exterior highway and bridge resurfacing are planned during the 1959 summer by the Dow Chemical Company.

Norman R. Peterson, manager of

Coatings Technical Service for Dow, said the latex mortar holds promise of simpler and more economical resurfacing. He emphasized that highway uses of the mortar are still in the evaluation stage.

Placement of the latex mortar has been made on bridges, highways and roads in Michigan, New

York and Vermont. Other placements are scheduled in Maine, Massachusetts, Ohio, Kansas and Texas.

Peterson gave this preliminary evaluation, based on road and bridge exposures during two northern winters:

"Ordinarily, when exterior concrete fails, it must be jackhammered, removed to 4-in. depth, and a total new pour of concrete made. This is time consuming, costly, and good bond of the new pour is often in doubt.

"With latex mortar, only loose sections of the old concrete need be removed. Then a relatively thin pour, usually one-half inch, of the latex mortar can be screeded over the substrate. The latex mortar has excellent adhesion, good flexibility to the wear and tear of traffic, and excellent durability. Its resistance to ice-removing chemicals is extraordinary."

At present, Dow has two different latexes which have been specifically designed for cement modification. The firm is also working with new Dow epoxy resin/sand mortars.



SAND BLAST

the easy RUEMELIN way!

A practical Sand Blast Generator for all types of outdoor cleaning work. Removes rust scale, paint. Cleans bridges, removes laitance from cement. Cleans ready-mix trucks and highway equipment prior to re-painting. Equipped with remote control with deadman valve for stop and start at the nozzle! Wet type nozzles also available if desired. Portable units can be equipped with hi-speed mountings for highway trailing.

Write for descriptive bulletin.

RUEMELIN MFG. CO.

3990 N. PALMER STREET MILWAUKEE 12, WIS., U. S. A.
MANUFACTURERS AND ENGINEERS — SAND BLAST AND DUST
COLLECTING EQUIPMENT — WELDING FUME COLLECTORS

... for more details circle 354 on enclosed return postal card

G RACE SWEEPERS



- Towed type with traction or engine drive.

- Front tractor mounted model.

Sweep right or left.
Brushes or fiber
for any sweeper.



GRACE CHIP SPREADERS ... for fast uniform coverage on seal coat jobs.

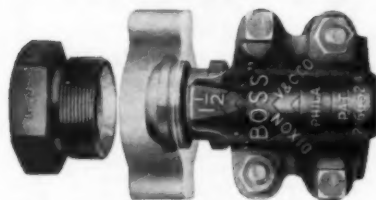
W. E. GRACE MANUFACTURING CO.
6007 S. Lamar • Dallas 15, Texas • HA 1-7147

... for more details circle 323 on enclosed return postal card

*Safest Connections
for Pile Driver Hose*
AND OTHER STEAM, AIR, WATER
AND HYDRAULIC APPLICATIONS

"GJ-BOSS"

GROUND-JOINT
FEMALE
COUPLING
STYLE X-34



The original washerless coupling that is unequalled for safety in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal...no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes $\frac{1}{4}$ " to 6", inclusive.

COMPANION
MALE COUPLING
"BOSS", STYLE MX-16



Companion coupling for "GJ-Boss", described above, and "Boss" Washer Type Couplings Style W-16. Will prove equally efficient and economical for all applications where standard iron pipe nipples are normally used. Each size fits same size hose...oversize hose not required. Coupling consists of I.P.T. male stem and "Boss" Offset and Interlocking Clamp. Steel or malleable iron, thoroughly rustproofed. Sizes $\frac{1}{4}$ " to 6", inclusive.

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DIXON VALVE & COUPLING CO., LTD. TORONTO Associate Companies
Pittsburgh Foundry Co., Bridgeville, Pa. — Precision Steam Valve Company, Canby, N.J.

... for more details circle 370 on enclosed return postal card

ROADS AND STREETS, June, 1959

Manufacturers' Literature

CONSTRUCTION CASTINGS: The 166-page current catalog of Neenah Foundry Co., Neenah, Wisc., covers manhole, inlet, and other iron castings used on streets, highways, airports, and other works. It is profusely illustrated with photographs and dimensions and cross-sections, provided with full tabular data, and indexed. "Ductile iron" for special applications where shock and loading requirements are extreme is described and comparative specifications are given.

For more details circle 194 on
Enclosed Return Postal Card.

PILE SHELLS: Atmco Drainage & Metal Products, Inc., has issued a new bulletin on "Hel-Cor" pile shells. It covers such subjects as speed of installation, strength and economy, and also illustrates steps in mandrel-driving. Typical installations are pictured, and tabular data given. Write to the company's Product Information Service, Middletown, Ohio, and ask for PS-14258.

For more details circle 195 on
Enclosed Return Postal Card.

ENGINES AND POWER UNITS: Two new catalogs covering the G-226 and the G-149 engines and power units are available from Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis. Both catalogs, BU-528 (G-149) and BU-531 (G-226) tell the design, engineering and performance capabilities of the units, with the help of numerous illustrations, including a center spread devoted to a cross section of the unit with descriptive marginal notes. Optional equipment is also listed.

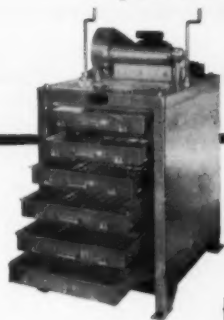
For more details circle 196 on
Enclosed Return Postal Card.

"OPERATION DURABILITY" is an 8-page report on the maintenance of five extra-heavy Ford trucks which were put into fleet service several months before the same models were coming from assembly lines. The tests totalled 504,546 miles, and showed no failure of any major component. Reports of the records are notarized. Each of the test units is pictured in service. Other pictures show special mechanical details. Copies of this report can be had from local Ford dealers or from Heavy Truck Sales Dept., Ford Division of Ford Motor Company, Dearborn, Michigan.

For more details circle 197 on
Enclosed Return Postal Card.

... for more details circle 320 on enclosed return postal card

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specifications



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For sizing test samples of crushed stone, sand and gravel, slag, coal and coke, ores, and similar materials in a size range from 4-in. to 200-mesh. Fast, accurate, requires little or no maintenance. The standard sizing control of the industry.



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Reduces large sample for convenient testing. Adjusts for all materials, sand to heavy aggregate. Simple to use. Heavy welded steel construction.

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COMPANY _____
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MALINTA, OHIO

Manufacturers' Literature

TRACTOR-SCRAPER: Improved features and production advantages of the new DW21 series G Tractor and No. 470 series B Scraper are outlined in "Out Front For '59", an 8-page booklet released by Caterpillar Tractor Co., Peoria, Ill. References include a boost to 345 horsepower from 320 on the former model; a 99.8% efficient dry type air cleaner; increased scraper capacity of 19.5 cu. yd. struck and 27 cu. yd. heaped; a higher apron lift; a new push block assembly and a new draft frame. Ask for Form No. D915.

For more details circle 198 on Enclosed Return Postal Card.

SCHIED BANTAM COMPANY OF WAV-ERLY, IOWA, has just published an 8-page specification bulletin No. 350-1, covering the new Series "350" Bantam crane-excavators. Included are complete specifications, capacities, work ranges, and features on the 11-ton carrier-mounted Model T-350, the 11-ton self-propelled Model CR-350, and the Model C-350 crawler-mounted units as well as the complete line of attachments. Features and specifications on all mountings are shown.

For more details circle 199 on Enclosed Return Postal Card.

AEROIL PRODUCTS COMPANY, INC., 14 Wesley St., South Hackensack, New Jersey, has announced a new leaflet describing a new 10-cu. ft. capacity "Power Buggy." The unit features a "dead man" brake arrangement and two widely spaced rear wheels for greater stability and easier turning. Ask for Leaflet No. BG-1.

For more details circle 200 on Enclosed Return Postal Card.

NEW LUBRICANT PUMPS: A catalog featuring the "newest line of air-motor operated lubricant pumps on the market in 20 years" is being offered by Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis, Missouri. Design and engineering features are fully covered for these pumps and also for allied equipment. The new pumps, designated "Power-Master", are available in standard combinations on Lincoln's complete line of "Lubrovans" and "Lubmobiles" and also to replace older model pumps on existing "Lubrovans" and "Lubmobiles".

For more details circle 201 on Enclosed Return Postal Card.

"CAT No. 7C BULLDOZER" a new 4-page booklet, Form No. 33344, available from Advertising Division, Caterpillar Tractor Co., Peoria, Ill., gives records of this bulldozer in quarry operation requiring stripping of rock-laden overburden and in land clearing, stumping, and piling.

For more details circle 202 on Enclosed Return Postal Card.

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FOR SALE Crawler Dragline

Bay City Model 45
Powered by GMC 371, new 1949.
Base new 1957. Upper rebuilt 1957.

Crawler Clam

Bay City Model 45
Powered by 6SRKR Waukesha, 18" crawler
shoes, older model. Good condition.

Backhoe Dragline & Crawlers

Michigan 1/2 yd. Model C-16 Combination.
Powered by JXD Hercules Gasol.ne. New
1949. Good condition.

Dragline & Shovel

Michigan 3/4 yd. Model T6D Combination.
Mounted on Michigan Carrier. Powered by
Hercules gasoline. Good condition.

Dragline

Insley Model L 3/4 Yd.
Mounted on wide Crawlers. Powered by D-318
Caterpillar Diesel.

Crane & Pullshovel

Osgood General Combination
Serial #2574, 3/4 yd. Backhoe on Crawlers.
Powered by Cummins Diesel.

Backhoe & Crane

Model 25 Northwest Combination. Serial
#11376, 3/4 yd. Backhoe on Crawlers. Pow-
ered by GM371.

Gyroflow

(2) IR 600 Model 6045C, Serial Nos. 11760 &
11767.

Loader

HD-11 Allis Chalmers, Front End, 2 1/4 yd.
capacity. Diesel Power. Less than 2 yrs.
old.

Tractor

Ferguson T35, with 616 Front Tires, 1100x28
rear, with Everett Trencher, complete and
Shawnee Dozer Blades.

Dredging Barge Sand & Gravel

40'x16' equipped with 8"x10" Ansco Pump,
powered by 335 HP Cummins Diesel. 50'
Boom with Cutter Head. All deck machinery
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TEN CRANES & SHOVELS

LORAIN "TL-25K" 3/4 yd. Diesel Dragline, re-
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KOEHRING "304" 3/4 yd. Diesel Shovel.

BANTAM "T35" 3/4 yd. Hoe, mounted GMC
6x6.

BANTAM "M49" 3/4 yd. Hoe or Dragline
mounted GMC 6x6 (4).

PGH NEW Shovel Attachment, complete. Dis-
counted.

NINE TRANSIT MIXERS

3—Jaeger & Smith 5 yd. Mixers.

2—Jaeger & Smith 4 1/2 yd. Mixers.

2—Jaeger & Smith 3 yd. Mixers.

Offered Mounted or Un-Mounted.

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DIXIE Port. Pulverizing Plant, 3x8 Feeder,
3x8 Cedarapids screen, 3036 mill, 30" under-
discharge conveyor GM "671" diesel power
unit. 6 years old. Overhauled.

GRUENDLER Used Portable Pulverizer Plant,
w/3x8 Apron Feeder, Gruendler 3XB Mill,
30" under-discharge conveyor, 3 axles, 1957
model. Also with Onan 35 KW Generator set
on 2 axles. This is a producer and is priced
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LeTOURNEAU "U-9" 9 yd. Scraper. Good
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HOUGH "HLD" 1 1/4 yd. Payloader, diesel.

IHC "TD-14" Diesel Tractor w/Hough Loader.

TERMS!

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ROCKFORD, ILLINOIS

TRUCK CRANES

1—2800 MANITOWOC Truck Crane on
Hendrickson chassis, 4 axles, independent
boom hoist, air controls, removable coun-
terweight. Just like new.

1—LS-120 Link Belt, 1 1/2 yard Crane on
factory built Maxi. 4 axle undercarrier,
air controls, 16—1400 x 24 tires. Tremen-
dous capacity—good shape.

1—1/2 Yard Model "E" QUICKWAY Crane
on 6x6. Small Log Loader \$4,250.00.

All these machines are in very good shape
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COAST CABLE CO.

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WINCHES IN OUR HOUSTON STOCK STEAM HOISTS

1—10x12 Washington 3-Drum, 20,000# SLP
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3—8 1/2x10 Clyde 3-Drum, 9,500# SLP
1—6x8 Lidgerwood 2-Drum, 6,000# SLP
1—7x9 Clyde 2-Drum 9,000# SLP
2—8 1/2x10 Clyde 2-Drum, 16,000# @ 40 FPM
1—10x12 Lidgerwood 2-Drum 14,000# (Lo-
cated Detroit)

ELECTRIC WINCHES

10—Clyde 1-Drum, 30 HP to 60 HP, all 220
or 440 volt, 3 phase, 60 cycle AC - 4000#
to 7500#
12—Vulcan 1-Drum, 14,000# @ 105 FPM with
50 HP, 230 volt DC motors (New.)
3—Markey 1-Drum 6,000# @ 40 FPM with
35 HP, 230 volt DC motors and controls.
3—Electro-Lift overhead trolley hoists, 6000#
17' lift, 208 volt, 3 ph., 60 cy. (New.)
3—Almon A. Johnson LST winches, 100,000#
@ 10 FPM, 1-Drum, 50 HP, 230 volt DC
motors.
2—Jaeger 1-Drum Towing winches, 32,000#
@ 10 FPM, 5 HP 115 VDC motors.
6—Bayard 1-Drum, 15,000# @ 42 FPM, 20
HP AC or DC motors.

GASOLINE & DIESEL HOISTS

3—Jaeger 1-Drum, 50,000# @ 10 FPM with
150 HP Continental Gas Engines and Torque
Converter.
4—Jaeger 1-Drum 32,000# @ FPM with 119
HP Hercules Gas Engine and Torque Con-
verter.
1—Washington 4-Drum, 50,000# @ 40 FPM
with Caterpillar D-13,000 Diesel.
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JXD Hercules Gas Engine.
1—Skagit 1-Drum, 23,000# SLP with Case
Engine.
4—Bayard 1-Drum, 16,000# with Hercules
Engines.
1—Jaeger 1-Drum, 13,000# with Continental
Engine.
1—Link-Belt 3-Drum, 60,000# with JT-6
Cummins Diesel, Drums hold 4500' of 1"
cable.
1—Lidgerwood 3-Drum, 12,000# @ 250 FPM
with Gas or Diesel Engine.
1—CH&E 2-Drum 2,500# with Wisconsin En-
gine.
4—Lidgerwood 1-Drum, 5,000# with Wauke-
sha Engines.

MISCELLANEOUS EQUIP.

40—Anchor Windlasses for 1" to 1 1/4" chain—
all electric powered.
32—Capstans - Hand and Electric Powered.
4—Clyde Swinger Attachments, 10,000# @
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1—Buda Model 1879 Diesel complete, 200 HP.
24—Maxim Silencers for 6-71 GM Diesels
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DITCHER 2,275.00
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- 1—JOY Model 315 COMPRESSOR on 4 Pneumatic Tires, Good Operating Condition.....\$3,750

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- 1—ARROW HYDRAULIC MOBILE HAMMER—NEW!! With 30" Tampor, Heavy Duty Breaker, Scoring Tool, Asphalt Cutter, 2 Wheel Spacers.
\$5,000 f.o.b. our Bronx Yard
(Current List Price: \$6,750)

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USED HOT MIX PLANT—All Electric Powered
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24 x 5 ft. Dryer, gas fired, automatic safety controls
Hot elevator and cold feed
Ten yard storage bin and steam boiler
Plant completely portable. Will trade for late model batch type plant.

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- 2—\$7FD 15 ton, w/Cummins engines, Serial No. 16601 and 16602. Like new.
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- 120-B Bucyrus Erie 5 yd. Electric Shovel.
- 2400 Lima 6 yd. Dragline.
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- 111-M Marion 4 yd. Diesel Dragline.
- 1201 Lima 3 yard Diesel Dragline.
- 595 Linkbelt 2½ yd. Dragline.
- 93-M Marion 2½ yd. Shovel.
- 54-B Bucyrus Erie 2½ yd. Dragline.
- 3500 Manitowoc 2½ yd. Dragline.
- 38-B Bucyrus Erie 1½ yd. Comb. Shovel & Dragline.
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- 95 Northwest 2½ yd. Shovel.
- Model 6 Northwest 1½ yd. Shovel.
- 25 Northwest Comb. 2yd. Shovel & Dragline.
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- 357 Unit ½ yd. Wagon Crane.
- 155A PGH ½ yd. Backhoe.

MISCELLANEOUS

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- D-7 Cat. Cable Dozer.
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4 Euclid Bottom Dumps Model 23TDT
New June, 1957. GMC 6-110 Engines.
Allison Torquematic Transmissions, 20
Yard Wagons. \$20,000.00 Each.

1 Ransome 34E Dual Drum Paver with
Cummins HBID-600 Engine, New July,
1955, with Aux Tank and pump also Pow-
er Loader. Excellent Cond. \$15,000.00

1 Ransome 34E Dual Drum Paver Cummins
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Serial No. CP 30094-BPK — 1955 model completely serviced and repaired as needed. Very good rubber. Approximately 600 hours on engine overhaul. Hour meter reads 4156 hours. \$19,500, f.o.b., Wichita, Kansas.

Serial No. CP 30078-BPK — 1955 model completely serviced and repaired as needed. Good rubber. Approximately 600 hours on engine overhaul. Very good at \$19,500, f.o.b., Wichita, Kansas.

TWO B-18 Euclid Motor Scrapers, 18-25 cubic yard capacity, powered with GM 610 300 hp diesel engines with torque converter, mounted on 27x33 (30-ply) tires.

Serial No. 27LDT-19068 — 1955 model with complete engine overhaul including new cylinder kits, new bearings, new head and standard crankshaft. Completely serviced and repaired as needed. Two good recapped drive tires and fair rear tires. In excellent operating condition. Shown 5268 hours. \$23,500, f.o.b., Wichita, Kansas.

Serial No. 27LDT - 19101 — 1955 model completely serviced and repaired as needed to put in very good condition; ready to work. Has 4,430 hours on the hour meter. \$21,000, f.o.b., Wichita, Kansas.

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BARBER GREENE 879A-879B SCREED PLATES AND TAMPER BARS. BIG SAVINGS on high abrasion resistant manganese Carbon Steel Plates ½ inch thick. Bars carburized and hardened to 60-62 Rockwell. Double life for both. Compare these prices with distributor prices.

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Manufacturers' Literature

DIESEL ENGINES: A new 16-page catalog, 13V-540, available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis., describes the design, construction and mechanical advantages of the two recently introduced 21000 and the 16000 diesel engines. It contains many illustrations, including charts, graphs, and a cutaway view of the engine.

For more details circle 203 on Enclosed Return Postal Card.

TRACTORS AND EQUIPMENT: A handy file-size folder, available from J. I. Case Co., Racine, Wis., contains complete operating and machine specifications on the full line of Case "Utility" wheel and crawler-mounted tractors and equipment. The company will honor requests from bona fide officials and engineers on letterhead of state, county, city, township, village, school board, park board, or other public bodies, or from contractors.

For more details circle 204 on Enclosed Return Postal Card.

GROUTING PRACTICE: A new 16-page bulletin issued by Master Builders Co., Cleveland 3, Ohio, explains how to avoid shrinkage through the use of properly applied non-shrink grout. Describing successful techniques with "Embeco", the bulletin outlines and illustrates common methods, different types of equipment, the mixing and placing of grout, and cold and hot weather grouting.

For more details circle 205 on Enclosed Return Postal Card.

AIR-COOLED DIESELS: A new 4-page bulletin issued by Hercules Motor Corporation, Canton, Ohio, describes its new line of "Jlo", lightweight, 2-cycle air-cooled diesel engines. The bulletin provides a detailed description of the 7-hp "Jlo-325" and 12-hp "Jlo-660", along with dimensional drawings, performance curve charts, sketches of typical uses, and a list of more than 70 suggested applications.

For more details circle 206 on Enclosed Return Postal Card.

JAMES A. MAIN has been named to manage the newly aligned Industrial Division of The Flintkote Company, as recently announced by George J. Pecaro, president. The new Division will handle the sale of products for the automotive, railway, paving, and industrial products for the building industry.

With the Manufacturers and Distributors

R. D. FAGEOL COMPANY, KENT, OHIO, manufacturer of flasher safety lights and barricades, has named Adams Construction Equipment Co., 1342 West Church St., Orlando, Florida, and Amick Equipment Co., 1812 Frink St., Cayse, South Carolina, as distributors for its entire line.

APPOINTMENT OF HERCULES MOTORS CORPORATION's first master distributor in Canada's Yukon Territory has been announced by William L. Pringle, president. Ed Jacobs Motors, Whitehorse, will handle and service Hercules' complete line—including air-cooled and liquid-cooled gasoline, diesel and LPG engines and power units ranging from 5 to 600 horsepower.

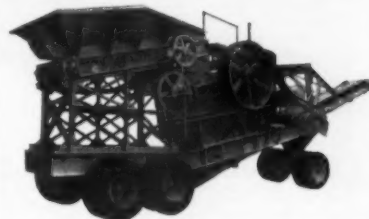
THE APPOINTMENT OF MR. EDWARD A. THOMA, 415 Garlow Drive, Pittsburgh, Pa., to the position of Vibratory Feeder Sales Engineer is announced by Syntron Company. His responsibilities include engineering of the company's extensive line of electromotive vibrating bulk material feeders, feeding equipment, flow control valves and hopper level switches.

APPOINTMENT OF L. G. "LOU" LENZ as used equipment manager, Highway Equipment Company, Pittsburgh and Du Bois, Pa., is announced by D. L. Reynolds, president. Mr. Lenz will be in charge of the repair, rebuilding and sale of all used machinery handled by Highway, which is one of the world's largest equipment distributors.

FRANK R. HINDS has been elected Vice President for Marketing for The Master Builders Company, Cleveland, Ohio. It was announced by Stephen W. Benedict, President. In the heavy construction field, The Master Builders Company, a division of American-Marietta Company, produces admixtures for the improvement of concrete.

ARMCO APPOINTMENTS: William I. Norman has been promoted to superintendent-operations of the Zanesville Works of the Armco Division, Armco Steel Corporation. Mr. Little also reported the promotion of Eugene R. Mizer to superintendent of Maintenance department.

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THE BEST THAT MONEY CAN BUY
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Speed Construction & Save your Tractors With
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- (1) Rips in rock—hardpan—clay.
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- DESIGNED TO FIT MOST MODELS OF D-6-7-8-9 Cat, TD-18-20-24 I. H. C., HD-15 to TD-21 AC.



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Sid Corbett—Molalla, Oreg., says "Big L end bits have put me ahead one-third more on my 1958 road building contracts."
Dick Schmitz—Tillamook, Oreg., says "Each set of Big L Dozer end bits have saved me from 8 to 10 tons of powder."
Curtis "Dutch" Deetz—Carson, Wash., says "Our road building contract for 1958 was estimated at \$100,000.00 thanks to Big L corner bits we were able to save an estimated 15%."
A Montana tree farmer says "Big L end bits have been invaluable in rooting out trees in our thinning operations."

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Western Equipment Co. Portland—Eugene	McGaragan Supply Co., Eureka
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Wood Tractor Co., Portland	Treasure State Equipment Co., Montana
Timberline Equipment Co., Portland	Construction & Mining Supply Co., Phoenix, Arizona
Gray's Harbor Equipment Co., Aberdeen, Washington	Tupes of Saginaw, Inc.—Michigan
Cal-Ore Machinery Co., Medford	Diesel Construction Equip. Co.—San Diego
Cascade Industrial Supply Co., Redding and Klamath Falls, Ore.	

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**With the Manufacturers
and Distributors**

SHERMAN NAMES SERVICE MANAGER: President William A. Romain has announced the promotion of Glenn A. Long from Assistant Service Manager to Service Manager of Sherman Products, Inc., Royal Oak, Mich., manufacturer and distributor of tractor-mounted earth moving, soil preparing and materials handling equipment.

HUBER-WARCO COMPANY of Marion, Ohio, announces the appointment of The Fred Greenley Machinery Company as distributor of Huber-Warco motor graders, tandem rollers, g-wheel rollers and maintainers in the northeastern section of Pennsylvania, which includes the counties of Bradford, Susquehanna, Wayne, Sullivan, Wyoming, Lackawanna, Pike, Columbia, Luzerne, Schuylkill, Carbon and Monroe.

LINCOLN HARVEY has been appointed international engineering representative for the Williams Form Engineering Corporation, Grand Rapids, Mich., according to an announcement by Mr. C. I. Williams, president of the firm. The Williams Company produces a complete line of concrete forming hardware for the heavy construction industry. Mr. Harvey will cover the market for its products in Asia, South America, Germany and the United States this year from its new international office in Nassau, Bahamas.

ERNEST E. SWARTSWELTER has been elected a director and vice chairman of Blaw-Knox Company, Pittsburgh, it was announced recently by W. Cordes Snyder, Jr., chairman and president. Mr. Swartswelter was chairman of The Aetna-Standard Engineering Company, recently acquired by Blaw-Knox.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position? Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

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CITY _____
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SIGNATURE _____

REID-HOLCOMB CO., INC., has been appointed a dealer for the entire line of Shunk Manufacturing Company's products, according to a joint announcement by Ralph Reid, President, Reid-Holcomb Co., Inc., Indianapolis, Ind., and J. W. Tufford, Sales Manager, Shunk Manufacturing Co., Bucyrus, Ohio. Reid-Holcomb's offices are located at 1815 Kentucky Ave., Indianapolis, and 6000 Boonville Hwy., E., Evansville.

A. R. BLACK, JR. has been named sales manager of the Lodestar Corporation, Niles, Ohio, manufacturers of aluminum and steel truck dump bodies and trailer dumps. The appointment was announced by Louis J. Tripodis, president of Lodestar, which is affiliated with the Niles Machine and Welding Company. Mr. Black will also head sales for Niles Machine and Welding.

APPOINTMENT OF MYLES S. GAYTHWAITE to the newly-created post of director of marketing-fixtures of Sylvania Lighting Products, a division of Sylvania Electric Products Inc., has been announced by Frank J. Healy, divisional president. Sylvania Electric is a wholly-owned subsidiary of General Telephone & Electronics Corporation.

DIAMOND T MOTOR TRUCK COMPANY, 4401 West 26th St., Chicago, Ill. has announced five new dealers: Idaho Equipment Company, Twin Falls, Idaho; Motor Equipment Company, San Antonio, Texas; Paducah Truck Sales, Paducah, Kentucky; Ceranski Bus & Truck Sales, Schofield, Wisc., and J. R. Broek, Inc., Manchester, New Hampshire.

OFFICIALS OF THE OHIO BRASS COMPANY AND HOLAN CORPORATION—wholly-owned subsidiary of Ohio Brass—have announced the purchase of Universal Hydraulics, Inc., Cleveland manufacturer of hydraulic components.

Universal Hydraulics will operate as a subsidiary of Holan and will continue to make hydraulic cylinders and valves. Immediate plans call for expanding the firm's production facilities and developing additional items for hydraulic service.

CHARLES A. WATSON, sales manager, Daybrook Hydraulic Division, Young Spring & Wire Corporation, Bowling Green, Ohio, has announced the appointment of H. J. Lewinski as Central Zone Manager for the company. The Central Zone includes the states of Illinois, Wisconsin, Michigan, Indiana and Ohio.

EUCLID DIVISION OF GENERAL MOTORS has appointed San Diego Tractor & Equipment Co. as authorized dealer for the complete line of Euclid earth-moving, mining and construction equipment. Located at 6055 Fairmount Extension, this new Euclid dealer will cover San Diego and Imperial counties. Harry Booth is president of San Diego Tractor.

ANTHONY M. (TONY) CAMARANO, former Washington representative of the Southern Pine Association, has been named manager of the Government Specifications Department of the National Lumber Manufacturers Association, Washington. Gerald F. Prange, director of NLMA's Technical Services Division, announced early in May.

ENGINEERED EQUIPMENT, INC., Waterloo, Iowa, whose factory and office building were badly damaged by a fire on April 18th, has its temporary office at 420 West Eleventh St., same P. O. Box 726 and regular telephone number. Temporary manufacturing facilities were leased immediately after the fire, and Mr. George Loveall, Sr. President of the company reports that there was a delay of only 10 days in the regular shipping schedule.

THE FORMING OF A NEW PRECISION HYDRAULICS DIVISION has been announced by the Owatonna Tool Company, Owatonna, Minn. The new division was created to concentrate on the hydraulics part of the regular OTC line of tools and hydraulic maintenance equipment, and to design and manufacture complete hydraulic pumping units for the O. E. M. market.

PYLACON, INCORPORATED, of Toledo, Ohio, manufacturer of traffic lane markers, highway post guards and rubber compound jiggle bars, has added three members to its executive staff as announced by Robert S. Wood, President: John E. Orloff becomes Vice President; Michael E. Driscoll assumes the new position of New Products Manager; Marshall E. Hyde is District Sales Representative.

MASSEY-FERGUSON Gets New Marketing Head: Appointment of Cornelius Whetstone, widely known equipment merchandising executive, as marketing manager for Massey-Ferguson Industrial Division, has been announced by J. H. Shiner, vice-president of marketing for the parent company in Toronto, Canada. Mr. Whetstone's duties will include supervision of all-over sales, merchandising and advertising operations of the Industrial Division.



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SCARIFIER-SCRAPER**

SCARIFY • SCRAPE • SPREAD • BACKFILL
LANDSCAPE • TERRACE

The Scarifier-Scraper Attachment is easily and quickly installed on Danuser 6' or 8' Blades. With it, you can rip, scarify, scrape, spread or drag large loads of dirt faster . . . easier. Controlled by operator from tractor seat. Mold-board quickly reversed for drag-leveling or backfilling. Teeth, with replaceable wear-resistant points, protected by shear pins. Write for literature showing adaptation to your make and model tractor.

FREE BOOKLET! "Guide for Better Terracing"

DANUSER MACHINE CO.
"Contributing to Farm Mechanization"

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BELLERIVE HOTEL
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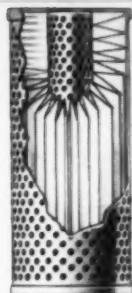
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SPECIAL REPORT TO CATERPILLAR OWNERS:



CUT MAINTENANCE COSTS...EXTEND EQUIPMENT LIFE BY CHANGING OIL AND FILTERS AS RECOMMENDED



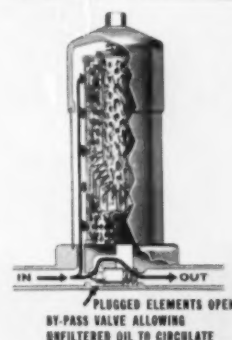
How often should lube oil and filters be changed? The answer is obvious—when the lube oil and filter can no longer do their jobs. But how do you know when that time comes? Can you afford to guess?

Guessing can be costly. The cost of oil changed *more frequently* than necessary adds up to big sums during a work season. *Delayed* oil changes can bring about premature overhauls with more parts replacement costs.

Manufacturer recommendations are based on sound principles. Rapid advancements have been made in perfecting "additive" lube oils that can reduce wear. The familiar ridge left in liners by the piston rings can be practically eliminated by the use of Series III Oils and proper maintenance practices! These oils also allow longer periods between changes.

Full benefit and savings from new oils cannot be had without proper filtering. Caterpillar Engines have an emergency by-pass valve that opens and allows unfiltered oil to circulate if the elements become clogged. And elements become clogged when their dirt-holding capacity is reached. Caterpillar elements have ample dirt-holding capacity to keep the by-pass *closed* over the recommended period.

But aren't the dirt-holding capacities of all makes of filters about the same? To protect the long life reputation of Cat Diesel Engines, Caterpillar continually tests all brands of elements offered for Cat Engines. Below are the *surprising* results, based on tests of filters purchased on the open market during 1957 and 1958. During these tests commercial test dust was gradually added to clean oil until each filter clogged and the emergency by-pass valve opened. The amount of dirt added is recorded in the "Sediment Index" column.



HOW CAT FILTERS COMPARE WITH OTHER BRANDS

Brand	Filtering Area (Square Inches)	Sediment Index (In Grams)	Comparison
CATERPILLAR	1450	75	Used as basis for recommended oil and element change periods.
BRAND A	1450	13	Cat element lasted nearly 6 times longer.
BRAND B	1170	22	Cat element lasted 3 times longer.
BRAND C	1000	34	Cat element lasted more than twice as long.
BRAND D	Not measurable	No oil flow	Opens by-pass immediately even when new.
BRAND E	1450	26	Cat element lasted nearly 3 times longer.



SERVICE TIP:

Get your copy of "Crankcase Lubricating Oil Change Recommendations," Form 32421-1W, from your Caterpillar Dealer right away. Keep pace with the new lube oil developments.

Your Caterpillar Dealer has the complete story on the advantages of changing lube oil and filters as recommended. Ask him to figure your annual engine oil costs for you, and see how much you can save. See him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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Adding to Milwaukee's mileage of Texaco-paved streets

Year after year, Milwaukee has added steadily to its mileage of plant-mixed Texaco Asphalt paving, serving both business and residential traffic. Van Buren Street, shown here, received a 3-inch surface of hot mix Texaco Asphalt Concrete, laid in two courses. Many other Milwaukee thoroughfares have been paved with another heavy-duty pavement of the plant-mixed type, Texaco Sheet Asphalt.

The continued growth of Milwaukee's mileage of Texaco-paved streets is the best kind of evidence of satisfaction with the pavement's durability, economy and velvet-smooth riding quality.

This "major league" city is another of the more than 1,500 representative U. S. cities which have paved their streets with Texaco during the past 55 years. Many of these cities have laid more than half-a-million square yards.

Two helpful Texaco brochures describe the materials and methods recommended for all types of Asphalt paving, suitable for streets, highways, airports, parking areas, etc. Copies can be obtained without obligation by writing our nearest office.



Laying 3-inch hot-mix Texaco Asphalt Concrete pavement on Van Buren Street in Milwaukee. Long-handled lute in foreground of small photo is used to check pavement's smoothness.

Contractor—Highway Pavers, Inc., Milwaukee.

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